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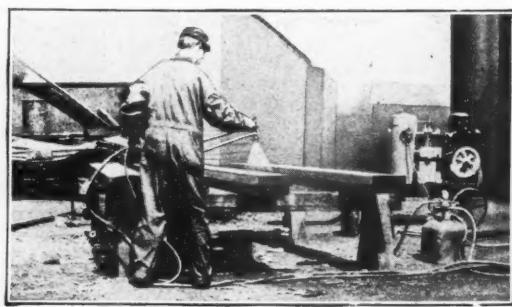
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EDITORIAL

THE FIRE SEASON

THE summer fire season of 1920 is, it is to be hoped, now a matter of history. So far as the western National Forests are concerned, the season has been an unusual one in several respects. A wet spring delayed the occurrence of any really serious fires until early in July, and gave rise to the hope that they were to be few and far between. Then came a period of dry weather which resulted in a rapid increase in the number of fires. The situation was particularly critical in Montana, Idaho, Washington, Oregon and California, where the development of widespread conflagrations was threatened. Fortunately, unusually high winds were not prevalent and rather general rains toward the end of August and the first of September virtually put an end to the danger of a catastrophe.

One of the interesting features of the season was the large proportion of fires caused by lightning. In western Montana and northern Idaho, for instance, lightning set no less than 1,200 fires, or approximately 80 per cent of the total number. These were so scattered and frequently so inaccessible as to render their control extremely difficult. So serious was the situation that in early August some 500 extra patrolmen and 1,200 fire-fighters were on duty at the same time. High winds and still drier conditions than those which actually existed might easily have resulted in a repetition of the holocaust of 1910.

Lightning was also responsible for many fires in Washington, Oregon and California. Here the experiments undertaken last year with the airplane as a means of fire patrol and fire reconnaissance were continued. While it is still too early to reach any final judgment as to the value of the airplane for these purposes, it has to its credit many instances of service rendered. In addition to detecting the occurrence of fires, it has been able to determine their exact location and area, the general character of material in which they were burning, and the

best means of approach. Information of this sort has made possible the selection of fire-fighting crews of the right size and has saved valuable time in getting them to the scene of the fire.

Information is not yet available as to the acreage burned and damage done. It is known, however, that in less than three months it has been necessary to incur emergency liabilities aggregating about \$700,000. This is over and above the much larger amounts spent annually by the Forest Service from its regular appropriations for the maintenance of a fire protection organization, the development of means of communication and transportation, and the purchase of supplies and equipment. The maximum expenditure, amounting to considerably more than half of the total, has been in western Montana and northern Idaho. Washington and Oregon come next, and California third. Wyoming and Colorado have escaped with the remarkably small total of approximately \$3,500.

To meet a situation of this sort, Congress, in the face of a request from the Forest Service for an appropriation of \$1,000,000 for emergency fire fighting, actually appropriated \$250,000. A deficit of \$450,000 has therefore already been incurred which must be met from funds appropriated and badly needed for other purposes, unless and until Congress sees fit to provide a deficiency appropriation. Last year, with a special appropriation of only \$150,000, a deficit of nearly \$3,000,000 was incurred. Under less favorable conditions, the situation this year, which passes for a relatively good one as fire seasons go, might easily have been equally bad. Will Congress never learn that in so vital a matter as the protection of our National Forests from fire it is true economy to appropriate at least reasonably near the amount that experience has indicated will actually be needed?

"THERE ALWAYS WILL BE LUMBER"

ONE of the lumber trade journals comments editorially as follows: "In spite of all that is heard about the difficulties of the manufacturers there always is lumber—AND THERE ALWAYS WILL BE LUMBER." Probably there will. We hope so at any rate. But the question is will there be enough lumber; what will be its

quality; how far shall we have to transport it; and what will it cost?

Somehow, we cannot feel entire confidence as to the abundance of future supplies of lumber when we reflect that we are now cutting or otherwise destroying our forests more than four times as fast as they are growing.

The steadily increasing shortage of raw material in many important wood-using industries does not help to reassure us. We cannot be blind to the fact that the disappearance of our virgin forests, unaccompanied by any real attempt to replace them by trees of equal size and quality, is resulting in a progressive decrease in the amount of high grade material available.

We cannot help feeling that a community such as Minneapolis, which formerly cut 500,000,000 board feet of lumber a year, would be better off today if all of its sawmills had not disappeared and if it did not have to import from 80 to 90 per cent of the lumber which it now consumes from the Pacific Coast. We cannot avoid a suspicion that there is some connection between the depletion of eastern softwoods and the fact that redwood siding last summer retailed at \$43 per thousand board feet in Eureka, California, and for \$130 per thousand

in Washington, D. C., in spite of the fact that the freight rate between the two places was only \$8.50 per thousand. It even strikes us as significant that the same issue which contained the editorial already referred to should have called attention to "the remarkable development of American markets for foreign lumber," and to the fact that "imports of lumber have doubled and, in many instances, more than trebled in volume and value within the year."

The signs of the times are too clear to be misread. That "there always will be lumber" is doubtless true. But it is equally true that it will be available only in insufficient quantity, of poor quality, and at excessive prices, unless we mend our ways. If we are to avoid unpleasant consequences we shall have to take prompt action to substitute for our present hit-or-miss treatment of our forests a policy that will make and keep them productive.

HARDING FOR CONSERVATION

ONE of the noteworthy developments in the Presidential campaign has been Senator Harding's unequivocal support of forestry and other forms of conservation. Speaking to a delegation of Ohio editors on August 13, he urged the importance of forest conservation as a means of insuring an adequate supply of newsprint paper. The fact that we now import from other countries two-thirds of the print paper that we consume, whereas ten years ago we were self-supporting, emphasizes the soundness of his plea for "a forest policy which shall make us self-reliant once more." Particularly gratifying is his recognition that "permanent and ample relief must come by going to the underlying causes." It is a superficial view which attributes the present shortage of newsprint paper primarily to such factors as inadequate mill capacity and restrictions on the export of Canadian pulpwood. The fundamental cause lies deeper. In the last analysis depletion of the forests, both American and Canadian, from which the pulp and paper industry draws its supply of raw materials is the real root of its difficulties.

A few days later, at a picnic of retail lumber dealers, Senator Harding showed his appreciation of the effects of timber depletion on other industries and on the nation as a whole. After calling attention to the steady decrease in the forest resources of the entire eastern United States

and to the effect of high lumber prices, due in part to "the very manifest diminution of supply," in halting home-building, he added that "no one can be blind to the fact that . . . we have been drawing on our natural timber supply without a thought of the future. . . . But we have learned the lesson now and we have not only to conserve, but we ought to have a national policy of conservation and reforestation. . . . I can think of no forward look in relation to the good fortunes of America which does not contemplate a forest policy which will assure us the essentials in the lumber line for all our constructive activities."

All of this is admirably and strictly in line with his formal declaration to a group of Governors on August 31, in favor of the conservation of all of our natural resources. It is also gratifying that Senator Harding does not attempt to make a political issue out of conservation. There is no reason why this should not be one subject on which both the Republican and the Democratic candidates are in perfect accord. Opinions may differ as to details of procedure, but the need for the protection and perpetuation of our forests is so clear and so urgent that every forward-looking American, irrespective of party, should find himself in agreement with the essential principle of preservation through wise use.

AN UNSOUND DOCTRINE

GOVERNOR PHILLIP'S interesting address at the Decennial Celebration of the Forest Products Laboratory on "Legislative Measures for Forest Conservation," contained one important recommendation with which foresters and conservationists disagree. In effect this was a disclaimer of any responsibility on the part of the individual States to conserve their forests, on the ground that forest production involves a long-term investment of doubtful financial return which it is unreasonable to expect the States to undertake, and that forest products are not for the use alone of the State in which they are grown, but of the entire nation.

If this view were generally accepted and applied it would effectually put an end not only to all State forestry activities, but to all private forestry activities. For if the States cannot afford to practice forestry and are without responsibility in the matter, private owners are still less so. The entire task is thus shifted to the shoulders of the Federal Government, practically all of the forestry programs now under discussion are knocked in the head, and any effective attempt at the conservation of the great bulk of our forests, four-fifths of which are in private ownership, is postponed until an indefinite future.

Fortunately, Governor Phillip's statement was immediately challenged by other speakers both at the decennial celebration and at the reforestation conference of the wood-using industries. Thus Colonel Greeley came out with the flat-footed statement that, while the growing of timber is a duty of the National Government, "it is a responsibility that the States also share. It seems to me that Wisconsin, Minnesota, and Michigan have an obligation to their own citizens, to their own welfare, their own future taxable property, and future industry to take an active hand in this proposition of growing timber. I am for State Forests as well as Federal Forests."

This is sound doctrine. Leaving altruism out of consideration altogether, the States, from a purely selfish point of view, have a profound interest in keeping their forest lands productive. Idle lands create no riches. Productive lands support a host of forest and wood-using industries, and contribute in countless ways to the welfare of the entire community. All experience

contradicts Governor Phillip's assumption that forestry is an unprofitable venture. Certainly those States which have tried it have not found it so. Pennsylvania, with its present State forest area of some 1,100,000 acres is making active plans to increase this to 6,000,000 acres. Massachusetts has just embarked on an ambitious program of forest acquisition. New York is steadily increasing its holdings.

To claim that State forestry is an unwise venture and that the States have neither interest nor responsibility in the conservation of their natural resources is to fly in the face of both history and logic. To attempt to put such dangerous doctrine into practice is to threaten the prosperity of the very people whom it pretends to protect. If Wisconsin is wise it will heed the experience of other States and other countries by embracing the first opportunity to enlarge its present holdings of State forest lands and to adopt a comprehensive and progressive program of State forestry in general.

WHERE WE STAND IN FOREST RESEARCH

THE recent bulletin on North American Forest Research compiled by the Society of American Foresters and published by the National Research Council constitutes a real contribution to our forest literature. Prepared primarily to serve as a clearing house of information on current investigative projects, it serves also as a record of progress and a promise of future accomplishment.

Systematic forest research in North America had its beginning as recently as 1908, when the Fort Valley Experiment Station was established near Flagstaff, Arizona. In 1909 came the establishment of the Forest Products Laboratory at Madison, Wisconsin, and in 1915 of the Forest Products Laboratories of Canada at Montreal. Today, some 520 projects, covering the entire field of forestry are being conducted by a wide variety of agencies. These include not only the Federal departments of Canada, Newfoundland and the United States, but from 40 to 50 State, provincial, college and corporate organizations and individuals. The comprehensive statement of investigative activities furnished by the bulletin

will be indispensable to those actually engaged in the work, and of marked value to all others interested in the progress of forestry.

While the bulletin contains no mention of expenditures, the results already accomplished and the extent of the work now under way will be a source of wonder to those who are familiar with the very limited funds available for research. The action of Congress last spring in reducing by 36 per cent the already meagre appropriation for experiment stations and other forest investigations is a striking example of the way in which research has been crippled by a niggardly and unprofitable economy. It is to be hoped that the more thorough understanding of the character, importance and possibilities of forest research which will undoubtedly be stimulated by the present bulletin will lead to its support on a more adequate scale. It will be of little avail to adopt the most progressive possible national forestry policy if its practical application is not based on thorough research in silviculture, forest products, forest economics and related lines.

"A DOCUMENT WHICH EVERY LUMBERMAN SHOULD READ"

THE editor of the *Lumber World Review* refers to the Forest Service report on Senate Resolution No. 311, more commonly known as the "Capper Report," as a "document which every lumberman in the United States who has a lick of interest in his affairs—as related to the Government—should purchase and read." *AMERICAN FORESTRY* would like to enlarge the editor's circle of readers to include every one interested in the welfare of the nation. The review of the report which appears elsewhere in this issue gives some idea of the principal conclusions reached. Nothing less than a com-

plete reading however, is sufficient to give the average citizen an adequate conception of our present timber situation. Unlike many Government publications, it is clear, concise and thoroughly readable from cover to cover. It is the most thorough study of the problem of our timber supply and timber depletion from an economic point of view which has not yet been made, and the facts presented furnish an incontrovertible argument in favor of the immediate adoption of an adequate forest policy for the nation.

FORESTS IN THE SAND HILLS

BY FRED R. JOHNSON

U. S. FOREST SERVICE, DENVER, COLORADO

THE weary traveler passing through the uninteresting sandhill region in western Nebraska on the Billings Branch of the Burlington Railroad is astonished after hours of gazing at bare sandhills, occasional sod ranch houses, and groups of cattle, to see before him green hills covered with evergreen trees. There is a rush to the south side of the train, a series of questions, and then a sign looms in view:

"Bessey Nursery,
Nebraska National Forest."

Are those trees natural growth; were they planted; what kind are they; why should we have a forest in these desolate hills, etc? For years a greater part of western Nebraska was known as the Great American Desert. A few ranchers occupied the river valleys and lower lying land close to lakes where they could cut enough hay to winter their cattle, which grazed in the adjacent hills. Other parts of the hills were used by herds of long horned cattle that were trailed across country from Texas and then sold in the fall at Missouri River markets. But this business proved unprofitable and twenty years ago there was very little use of the sandhills.

About that time a movement, led by Dr. Charles E. Bessey, Dean of the Botany Department of the Univer-

sity of Nebraska, was started to utilize a portion of these sandhills for the purpose of raising timber for the prairie states. This was shown to be practicable from the growth made by a plantation of jack, Scotch and yellow pine established in 1891 on Bruner Brothers' ranch in Holt County, Nebraska, by the Federal Division of Forestry. It was felt that the production of timber and the grazing of cattle might be carried on together, as in much of the mountain country, and the land would thus be put to a higher use. Nebraska has almost as small a forest area as any state in the Union and large quantities of material are needed annually for use on ranches and on the excellent farms in the eastern part of the state.

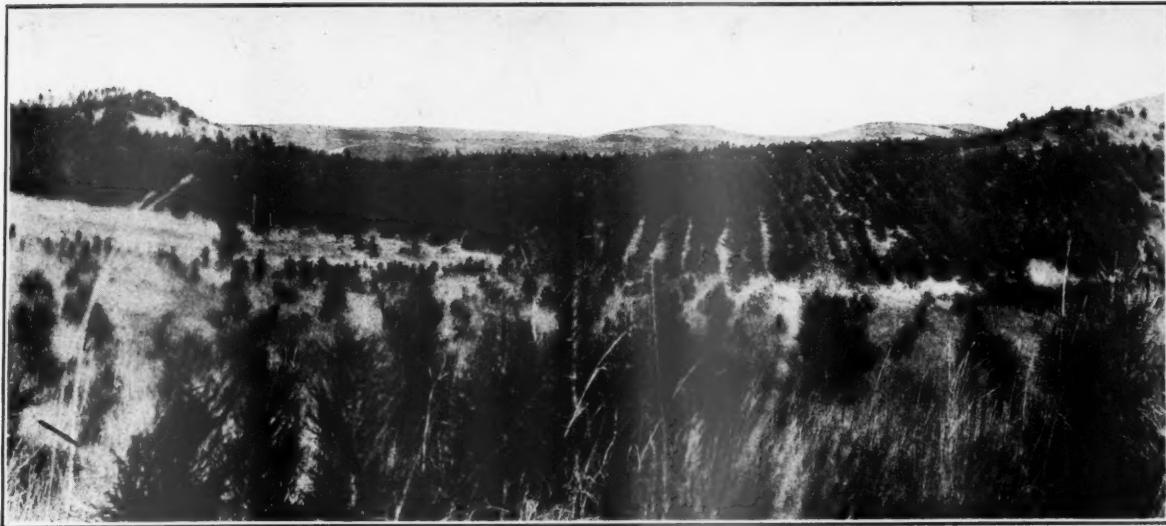
Accordingly, in 1902, after an examination of the land in this region by forest experts, an area of 206,000 acres was set aside by Presidential Proclamation—0.4 of 1 per cent of the total area of the state, reserved for raising timber.

In 1903 the first plantation was established with jack pine seedlings pulled from the forests of Minnesota. These trees now range from 20 to 25 feet in height and forest conditions prevail, the grass having been shaded out and replaced by a litter of pine needles, and the lower limbs of the trees are falling off. A comparison with the jack pine plantations in Holt County, previously men-



VIEW FROM LOOKOUT TOWER, NEBRASKA FOREST

This shows the system of fire breaks, the nature of the country, and yellow pine planted in 1914 in the foreground, with older planting in the distance. The plantations are divided into units of about 160 acres each.



JACK PINE PLANTATION

Established in 1911 in Nebraska Forest. The rows of jack pine are now rapidly closing. Yellow pine planted in 1911 in the foreground.

tioned, indicates that three or four posts can be cut from each tree twenty-five years after planting. If 800 trees per acre reach maturity out of 1,500 planted and posts are worth four cents each on the stump, receipts from the sale of the posts would amount to \$128. Assuming a cost of \$16.00 per acre for planting and that it costs 15 cents annually per acre for protection on this intensively

has an annual output of from one and a half to two million trees. Western yellow pine (*Pinus ponderosa*) and jack pine (*Pinus divaricata*) are the most successful trees for this region, many others having been tried out and found not suited. Seed is sowed in the nursery in beds four feet wide and the little trees grow here for two years. Then they are transplanted or set out in nursery



YELLOW PINE PLANTED IN 1909

A high survival has resulted and the trees are making a wonderful growth. This is also in Nebraska Forest.

managed tract and compounding these costs for the period, net receipts of \$89.00 result, or \$3.56 per acre annually for each year of the life of the stand. This is a much higher return than can be secured from this land when used for grazing cattle.

In 1903 a nursery was started near Halsey, which now

rows for another year's additional growth before they are ready to plant in the hills.

The success of the work near Halsey resulted in Nebraska people requesting Congress to establish a nursery and to extend forestation work to the Niobrara Division of the Forest. A site was secured on the

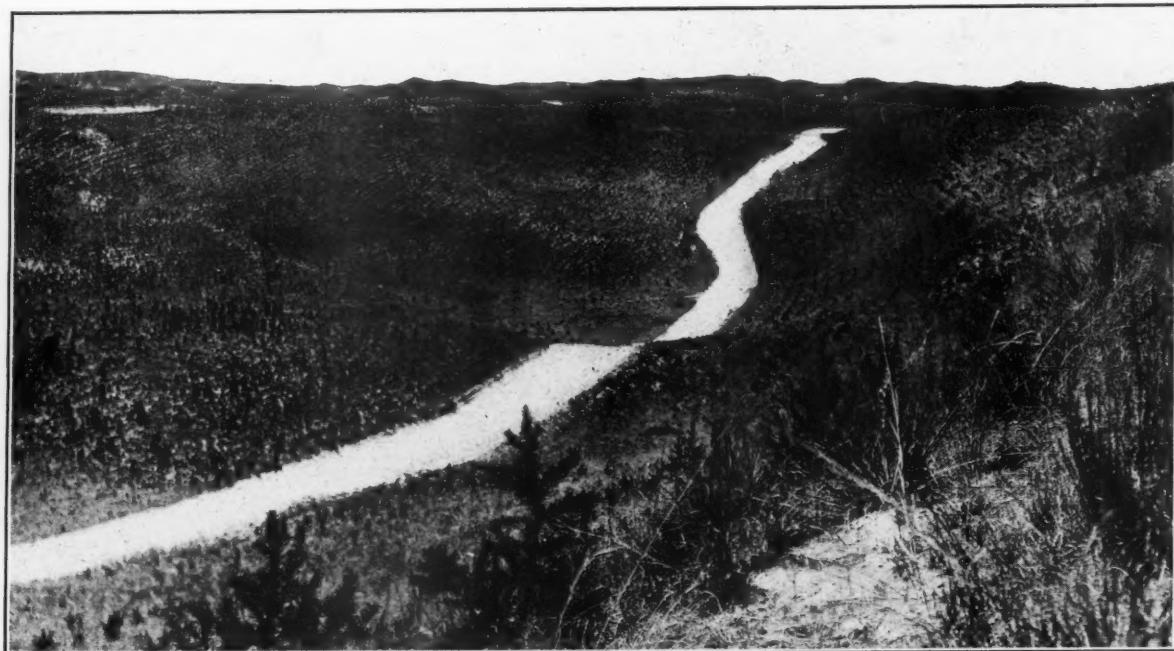
Niobrara River and in 1915 ground was broken for nursery purposes. The work here will be rapidly pushed along the same lines as at Halsey.

The trees are dug in the spring and hauled immediately to the planting site. Temporary camps are established throughout the hills. A barn accommodating forty horses, a mess house in which fifty men can be fed, and bunk houses accommodating twelve men each, are built in sections so that they can be moved conveniently every four years. Wells, 100 to 150 feet deep, must be sunk

small trees with the dirt they push out from their runways and also eat the roots of the larger trees.

To protect the plantations from fires they are divided by fire lines into units of about 160 acres. These consist of two plowed strips—a rod wide—placed from 100 to 150 feet apart. In the fall the grass between the plowed strips is burned off. This system has proved very effective and there have been no fires in the plantations since 1910.

The remnant of Nebraska's once large herds of deer



LOOKING DOWN ALONG THE FIRE LINE

Jack pine, established in 1913, to the right of the fire line; yellow pine, established from 1907 to 1909, to the left of the fire line. Nebraska Forest. A few single fire lines have been constructed for use in back firing or for stopping ground fires.

for water. One section (640 acres) is planted annually and the camps are arranged so as to be centrally located.

The trees are planted in furrows, a side hill or reversible plow being used for this purpose. A machine called a trencher, which consists of a V-shaped piece of iron attached to a plow beam, follows the plow and makes a slit in the middle of the furrow into which the roots of the trees are placed. The planter closes the slit with a thrust of his foot. A crew of six planters will set from twelve to fifteen thousand trees per day. About 35 horses and 45 men are used in the average camp during the planting operation. In addition about fifty men are employed at the nursery digging trees, transplanting, sowing seed, etc. The spring operation lasts from a month to six weeks.

Approximately 3,500 acres have been planted successfully at a cost of about \$16.00 per acre. From 1,500 to 1,800 trees are set per acre. At present survivals of fifty to sixty per cent can be expected in the driest season, while under favorable conditions ninety per cent of the trees will live. Losses have been caused by drought, pocket gophers and fires. The pocket gophers bury the

are to be found on this forest. Frequently they are to be seen taking advantage of the shelter afforded by the young forest. Thus the future forest, located in the midst of a treeless country, will be a game refuge, a future playground for people in the prairie country, and a source of timber.

PLANTING TREES IN FARM GULLIES

PLANTING trees in farm gullies is a reclamationary measure advocated by the Forest Service of the United States Department of Agriculture. The results are of two-fold advantage, as not only are the trees valuable in themselves but their presence stops the gully erosion. In the north Atlantic and mountain states and in the Mississippi Valley the locust is well adapted for this use as it has a large root system, grows rapidly and makes one of the most lasting woods for fence posts. The little trees may be dug up in locust thickets or obtained from commercial nurseries.

In other sections the native shortleaf pine is one of the best varieties for reclaiming gullies as it exerts even when young a marked influence in holding the soil. When set out in gullies, its growth is fairly rapid and in a few years it forms a complete protective cover.

FISH IN FOREST STREAMS AND LAKES

BY R. W. SHUFELDT

(PHOTOGRAPHS BY THE AUTHOR)

WERE it not for our forests there would not be many fresh water fish—or to carry the illustration further, if our forests disappear, so will, in large part, those fine streams which fish frequent and fishermen love. The subject of recreation in our forests, which is coming more and more to the fore, includes fishing, and this article is written to give some account of some of the fish which are caught in streams that run for miles through forest areas, or in lakes and ponds located in the very depths of timbered country. Beyond a brief description of the Striped Bass, which runs far up some of our larger rivers to spawn, no mention of marine fishes will be made here; of these there are many hundreds of kinds inhabiting the coastwise waters of the Atlantic and Pacific Oceans, as well as the Gulf of Mexico. The writer has caught many of these all the way around the coast line from Long Island Sound to Galveston Harbor, Texas. But they do not interest the lover of the forest, while an account of our trout, our pikes or pickerel, our catfishes, basses, and others that he knows more or less about from having taken them and handled them himself, would naturally appeal to him.

With but few exceptions, all of our fresh-water fishes are represented by several species making up any particular genus; for example, the catfishes, sunfishes, and trout all illustrate this fact, as well as the herring group and others that do not particularly interest us here. Dr. David Starr Jordan, our greatest authority on American fishes, long ago published the fact that "the catfishes abound in all the fresh waters of the United States east of the Rocky Mountains. The species of the three genera, Channel Cats, Horned Pout, and Mud Cats, which constitute the bulk of the family as represented in North

America, all reach a length of from one to five feet, and all are food fishes of more or less importance. One of the Catfishes, the Mississippi Cat, is our largest fresh-water fish, weighing upwards of one hundred and fifty pounds; and two of the others, the Mud Cat and the Great Lake Catfish, reach a very considerable size." In quoting this paragraph, the liberty of substituting the common names for the scientific ones has been taken.

Our "Bull-head" is the best known species of the family, and it is the common form of cat of the New England and Northern States. Many know it as the "Bull-pout," "Horned Pout," and sometimes as the "Minister." A number of years ago they were successfully introduced into the rivers of California, where they are now quite abundant; an excellent picture of one is here produced in Figure 3.

It is great sport to fish for catfish on a rainy night, using small pieces of raw beef for bait, scented with a drop or so of the tincture of assafoetida to attract them. Among the water-lilies is a great place to try it—a bamboo pole and line is all the rig necessary; but to keep dry, one should be dressed in rubber from head to foot. When the catch runs at three or four pounds to the take—to get a good mess does not carry one very far

into the night; and if properly cooked over the campfire, they are more palatable than some people represent them to be.

Speaking of catfish, a great place to fish for them is in any suitable locality in the Potomac River (Fig. 4); indeed, that stream is noted for the great variety of fishes that are indigenous to it. Among others may be mentioned two or three species of sunfishes (Figs. 6 and 7); white and yellow perches; black bass; striped bass, and shad in the spawning season; crappie, eels,



FOREST LOVERS IN CAMP

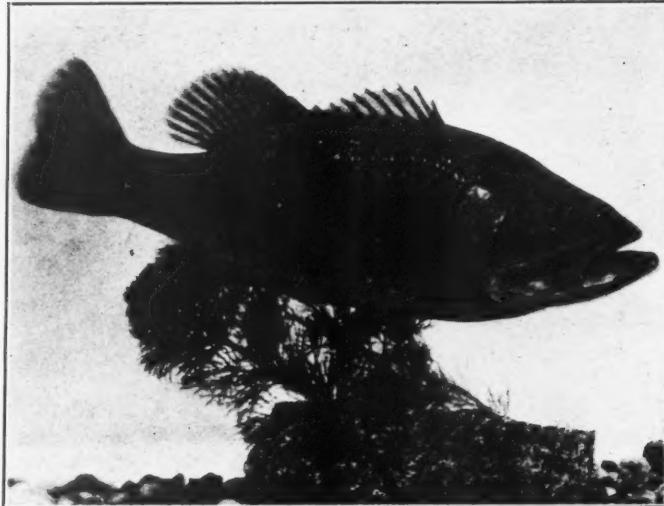
Figure 1. Evening on the borders of an Adirondack Lake with a mess of fish for dinner.

carp, and many others.

As most people know, the black bass are of two species—the Small-mouth Black Bass (Fig. 2) and the Large-mouth Black Bass; both belong to the genus *Micropterus*, and are readily distinguished through the fact that in the last-named form the angle of the gape of the mouth is back of the imaginary vertical line from the center of the pupil of the eye upon either side. So gamy are these fish that, on the lakes in the Northwest and elsewhere, they are known as the "game-fish of the North," and most of our anglers prefer to fish for them above all other kinds. In 1868 the writer landed many a one from his boat on either of the united lakes, La Belle and Fowler's, in central Wisconsin,—that is, at Oconomowoc. They made superb fishing there, for the waters of those lakes are deep and clear; the fish are wonderfully gamy; and to catch one weighing six pounds happened often enough to make the sport most exhilarating.

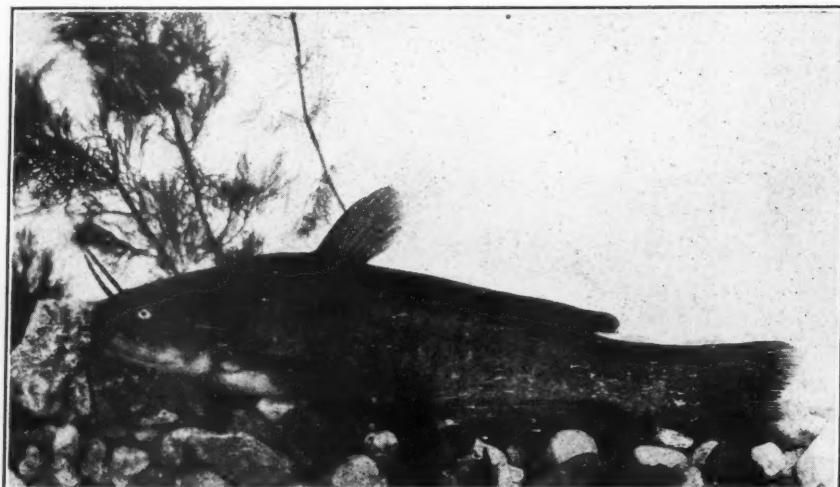
These fish have received many English names—so many in fact that it would be a waste of time and space to attempt to enumerate them here. Both have a wide range over the greater part of eastern United States, and at this time both have been introduced into western waters.

Black basses are very satisfactory fishes to introduce into new habitats. Dr. Goode has pointed out that "a few young bass will multiply so rapidly as to stock a large lake in five years. The Potomac and its tributaries swarmed with them ten years after their first introduction." It is Mr. W. W. Shriver, of Wheeling, West



THE BLACK BASS

Figure 2. In a large part of the United States there is no better known fresh water game fish than the Black Bass, nor one more generally sought after. There are two species of Black Bass in this country, namely the large and the small-mouthed. The one here figured is the small-mouth, and it may be identified by the angle of the jaw being below the eye and not reaching back of it.



THE CATFISH

Figure 3. Catfish are usually caught with hook and line at night, and, of its kind, the sport is not to be despised. This is one of our smaller "cats," for some of the species are giants in their way, specimens of the Great Mississippi Catfish, for example, weighing as much as 150 pounds.

any of the various species of our common Sunfish (Figs. 6 and 7); although be it known, as a rule these species are generally regarded as *the* game fish of our small boys. The common sunfish is an abundant form in most lakes and rivers, from the Great Lakes to southern Georgia. Dr. Kirkland has given us some very

Virginia, who deserves the credit of having planned and carried out the enterprise of transferring this fish from the Ohio River to the Potomac. This was as long ago as 1853, and the present generation of fishermen should remember this fact.

The published history of the Black Bass is quite extensive and interesting; but at this point we must pass to the notice of some other fishes. In doing so, however, it will be well to note that we have, in the inland waters of the United States, a long list of fish that are

known under the name of bass of one kind or other. Not only is this true, but those fishes as a rule all belong in very different families, and in most instances are not especially closely affined. *The* bass of the South is the Red Fish; then we have the Striped Bass (Fig. 5), which has several vernacular names besides. All of our sunfishes, of which the common Pumpkin-Seed or Tobacco-Box is an example, have all been designated as

various kinds of basses; and there is the Brassy Bass, the Calico Bass, often confused with the Crappie; the Silver Bass is another name for the "Moon-eye," and many other examples could be given.

Many people—and forest-lovers among them—by no means despise such sport as there may be in angling for

interesting points on the breeding habits of this species, which he very truly says "prefers still and clear waters. In the spring of the year the female prepares herself a circular nest by removing all reeds or other dead aquatic plants from a chosen spot of a foot or more in diameter, so as to leave bare the clean gravel or sand; this she excavates to the depth of three or four inches, and then deposits her spawn, which she watches with the greatest vigilance; and it is curious to see how carefully she guards this nest against all intruders. In every fish, even those of her own species, she sees only an enemy, and is restless and uneasy until she has driven it away from her nursery. We often find groups of these nests

being in shallow water, as Doctor Kirkland observes, we may say this only holds true where there is no great rise and fall of tide. For example, those who have studied the breeding habits of the Common and Long-eared Sunfishes (Fig. 6) in the Potomac, near Washington, know very well that, in such localities as the inlet at Four Mile Run and similar places, the tide may rise many feet; and that at high tides, where the sunfishes have built their nests close to the edge of the pond or inlet in shallow water, these will often be far from the shore and in comparatively deep water. So far as known, all other species of our sunfishes of this and closely allied species possess the same breeding-habits.



WHERE WASHINGTON FISHED

Figure 4. One of the finest rivers in which to fish for Black Bass is the Potomac River. The scene here shown is at Miller, Virginia, less than a mile west of Mount Vernon. General Washington and his friends fished off this point—more than a century before the little boathouse was built there.

placed near each other along the margin of the pond or river that the fish inhabits, but always in very shallow water; hence they are liable to be left dry in times of great drought. These curious nests are most frequently encircled by aquatic plants, but a large space is invariably left open for the admission of light."

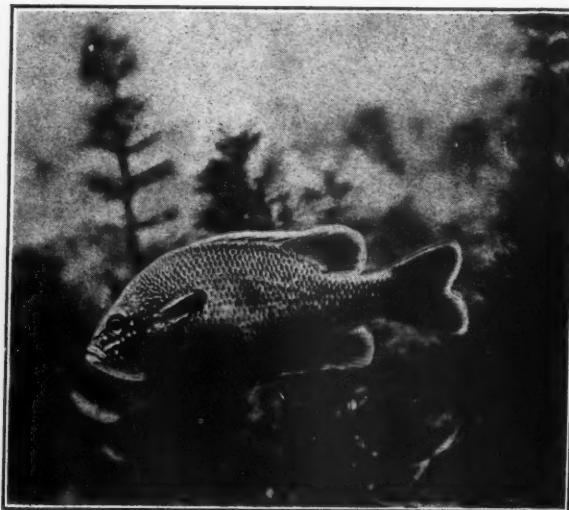
The writer has seen these sunfishes breeding in many waters in a number of the States east of the Mississippi, and their habits in this respect vary considerably, although essentially similar. Occasionally it will be observed that the female fish, where the bottom is pebbly, has the habit of pushing the pebbles away from the area she has chosen for a nest, and in so doing forms a circlet of them about the latter that causes it to appear more like a "nest." As to the latter always

It may be of interest to the readers of AMERICAN FORESTRY to know that the beautiful Long-eared Sunfish here shown in Figure 6 inhabited one of the large tanks in "The Grotto" at the United States Fish Commission Building in Washington as long ago as 1900. It is by no means an easy matter to photograph active fishes like this Long-eared Sunfish while it is swimming at large in a tank containing three or four hundred gallons of water. The day the photograph was taken was a very warm and sultry one in July, and the lens of the camera had to be focussed on some imaginary spot near the center of the tank, with the hope that the fish *might* come to rest there sooner or later as it swam about its home. After waiting for an hour or more, this actually happened, and an instantaneous exposure

accomplished the desired result. Several years thereafter the writer was well repaid for his patience and labor, as this photograph, grouped with others of fish and various living creatures, was awarded a prize at the Exhibit of the Royal Photographic

Society of Great Britain, held at Liverpool. The Common Sunfish shown in Figure 7 was secured by the writer in one of his own aquaria the day after it was caught in the Potomac River.

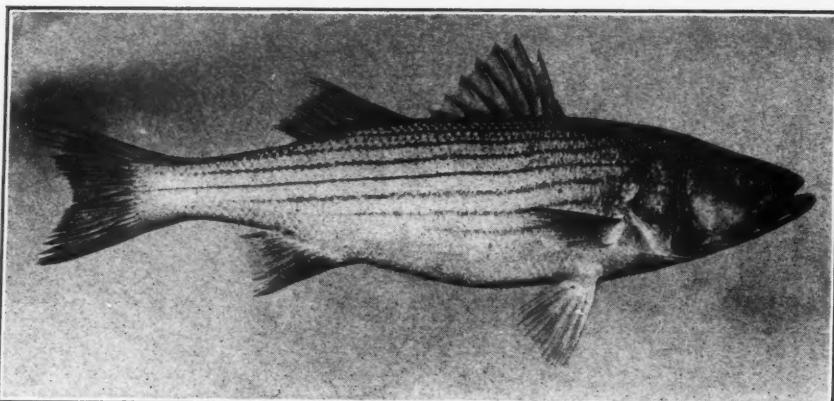
When properly cared for, these sunfishes may be reared in aquaria from little bits of specimens less than



THE STRIPED BASS

Figure 5. It is said that this fish—the Striped Bass—may attain a weight of forty pounds, while market specimens seldom range over half of that. Naturally, there is a large literature on this famous food fish, which is a species ranging all the way round the eastern and southern coasts of the United States.

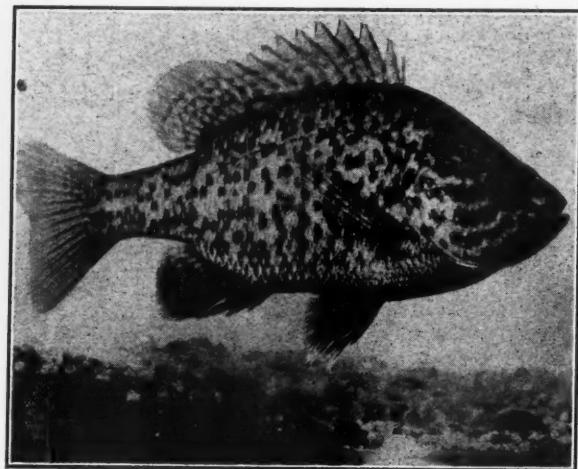
two centimeters long. Two such fish are at hand at this writing, swimming contentedly about in a medium-sized aquarium; each is now more than three times the size it was when taken from its river home, and each has begun to assume the pretty colors of the adult of the species. In fact, an old male sunfish of the Common variety, when in full color, is really an exceptionally beautiful fish. Rarely do they exceed a pound and a half or two pounds in weight, being easily captured with angling worms and the simplest sort of rod, hook, and line, with the usual float and light sinker.



THE STRIPED BASS

Atlantic States. Economically, our Striped Bass is doubtless the most important fish where it ranges; but beyond question this White Perch stands next on the list. (Fig. 9). It is wonderfully abundant in the streams that empty into the bays along the Atlantic Coast, as far south as Florida.

As long ago as 1878, we read in the Report of the United States Fish Commission that "after the middle of June the White Perch are found in localities widely different; even waters with a dense growth of lily and river weed are found to contain them in apparent health and vigor—spots where the Rockfish could not live a day. Still later in the summer, as the young Perch become quite strong and of some size, the river, although



ANOTHER SUNFISH

Figure 7. Another beautiful Sunfish is the common species—the "game fish" of boyhood days. It has many other names, as "Pumpkin Seed," "Tobacco Box," and "Sunny." Sunfish of this species are found as far south as the streams of Georgia, and westward to the Great Lakes. As a "pan-fish," it has furnished many a forester a breakfast.

in and about tide-water, fairly teems with them. At this season they go in schools, sometimes of large size. Twelve, fifteen, and twenty dozen August Perch have been known to be taken with a line in as short a time as from three to five hours. Fishing in this way, a

Of all our best known fishes—that is food fishes—no one is a greater favorite than the White Perch—*Roccus americanus* of science. It is one of the best "pan-fishes" known, and the most abundant one in the markets of New England and northern Atlan-

line with a half dozen hooks is used, and worms, sturgeon spawn, or live minnows are used as bait. These schools of small perch were supposed to be the broods of the preceding May, and that they kept together until late in November. They pass down to the salt water and there separate. Larger adult fish are not as restless as these smaller ones; are found in deeper water, and usually in tide-waters."

A two-pound White Perch is a big one; and, as a rule, they run more than half that weight to the catch. Where forest lovers are most likely to meet with this fish will be during certain seasons of the year in those streams along the Atlantic Coast running soon into brackish water, and where extensive timberlands exist. They are easy fish to capture, for they eagerly take the right sort of bait, and few kinds make a better breakfast for the hungry woodsman. White Perch, when taken in salt water creeks, are found to be of a much darker color; but it must be remembered that it is identically the same species as the silvery white ones caught in clear ponds and streams of fresh water.

From the viewpoint of one who possesses the necessary knowledge of the science of fishes, together with their structure and true affinities, the fact is patent, upon comparing all these species we call "perch" in this country, that we really have in our fish fauna but one true

perch, and that is the Yellow Perch. This favorite of anglers everywhere has quite a wide range, occurring as it does in nearly all the streams of New England, westward to include the system of the Great Lakes; while east of the Allegheny Range and southward to northern Florida, it is very abundant in certain localities. At the proper seasons of the year we may note many of them

for sale in the markets of the cities, in the northeastern parts of the country. This perch rarely exceeds two pounds in weight or measures much over a foot in length, the average being rather under than over these figures. Where they exist in numbers, it requires but a short time to catch a good mess for breakfast, as they are voracious feeders and bite eagerly when minnows or angling-worms are used as bait.

In many localities over their range, these perch are very abundant and much sought after, the largest fish being caught in various localities in the Great Lakes, where a two-pounder is not a rarity. As a rule they are



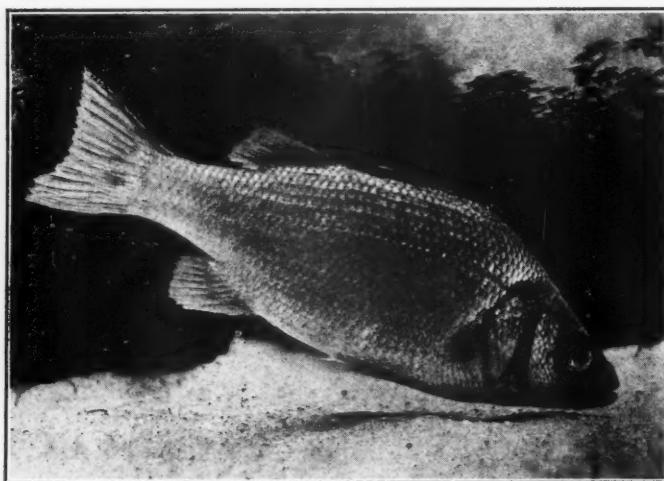
A HAUNT OF PIKE AND PICKEREL

Figure 8. Pikes and some other fishes love such a pond as the one here shown, especially should it be connected with some clear, though sluggish river. Down in the dark, right hand corner of this pond, where the leaves of the pond lilies float, is an ideal retreat for a pike or pickerel.

heavier when taken in the Lakes than those obtained in the rivers running into them. The example of the Yellow Perch here shown in Figure 10 was a Potomac River specimen and purchased in the Center Market of Washington. It weighed but half a pound; and, although the markings were not very pronounced, still it gives an excellent and correct

idea of the appearance of this widely known fish.

Passing to the Pike family, we have a very interesting member of it in our common Pike or Pickerel—a fish indigenous to both Europe and America, and familiar to anglers in all parts of its habitat; it also occurs in some of the waters of northern Asia. It is a relative of the mighty Muskellunge, and still other species are members



THE WHITE PERCH

Figure 9. One of our most important food fishes is the White Perch; in fact, in this respect it is only exceeded in the East by the Striped Bass. White Perch (*Roccus americanus*) make attractive aquarium fish; the one here represented is from a photograph made by the writer at the United States Bureau of Fisheries, where it occupied one of the large tanks.

of the same genus, as the Common Pickerel and the two species of Brook Pickerel. These last two are so small that fishermen pay them but scant attention.

Muskellunge sometimes run up to one hundred pounds in weight, and to land one with rod and line is a feat not to be forgotten in a lifetime. The writer once witnessed a fight with one on Silver Lake in Wisconsin, which, when captured, was found to weigh but 25 pounds. The gentleman who took it was in an open, light canoe, and handled a delicate steel rod with the finest sort of a reel and line. To witness the skill with which he finally brought that big fish to gaff was a sight never to be forgotten; all of three-quarters of an hour was required to do it. The writer has taken Common Pike in many waters, as in the streams of New England, in the lakes of the Catskills, and in various sections of the Northwest. Sometimes, when afield without a rod, a fine fish has occasionally been taken with a shotgun; for, as we all know, a pike has the habit of resting near the surface of the water as motionless as a stick, so that it is an easy matter to shoot it; but, it must be admitted, it is not a very sportsmanlike procedure. Still, with no tackle at hand, and one has no fish for breakfast in a forest camp, we must believe that such an act would be more or less justifiable and that the forester would be forgiven for it.

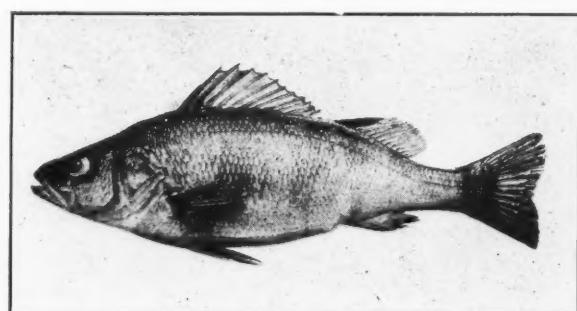
Pike are usually found—especially in New England—in deep, still mill-ponds, where the water is quiet and water lilies grow in patches of greater or less extent.

Behind these an old pike will lie in ambush a few inches below the surface, awaiting the passage of minnows or "shiners;" upon these he has no mercy, seizing them in his powerful jaws, and devouring probably several dozen in the course of twenty-four hours. During the spawning season the fish are found in pairs; but at other times they live singly and at greater or less distances apart. They

may be taken with the trolling-line, or, better still, with live minnows and any ordinary tackle. On a big mill-pond that has not been over-fished, six or eight big pike may be taken with the rod from a boat in the course of a forenoon's fishing. One should scull cautiously through the open water, and cast the bait over into the places where the lily-pads are, and where the pike are in concealment. It is remarkable to note the voracious manner in which one will rush through the water to seize a minnow struggling on the hook; and when hooked, the fish, if a big one, will put up a lively fight in its efforts to escape being taken, often springing clear of the water in its attempts to shake the hook out of its mouth.

An even more gamy fish is our common Brook Trout—a species known to anglers throughout the world. An excellent picture of this famous game-fish, and the sort of brook wherein it may be found are here shown in Figures 12 and 13.

With respect to the distribution in this country of the Speckled Trout—the *Salvelinus fontinalis* of science—Doctor Goode has said that the "Speckled Trout has its home between latitudes $32\frac{1}{2}^{\circ}$ and 55° , in the lakes and streams of the Atlantic watershed, near the sources of a few rivers flowing into the



THE YELLOW PERCH

Figure 10. Although not an especially gamy fish, the Yellow Perch is one of the anglers' standbys from boyhood up. During the fishing season, this perch is exposed for sale in great numbers in our markets, and it is esteemed very highly as a food fish.

Mississippi and the Gulf of Mexico, and in some of the southern affluents of Hudson's Bay. Its range is limited by the western foothills of the Alleghenies, and nowhere extends more than three hundred miles from the coast, except about the Great Lakes, in the northern tributaries of which Trout abound." It is a fish with remarkable habits, and a long and more than remarkable history. No end of books have been written about its natural history



THE QUICK AND FIGHTING PIKE

Figure 11. A gamy group of fishes are the Pikes, Pickerel and their various congeners of the lakes and streams in many parts of the country. In so far as animal food is concerned, the Pike is practically omnivorous, as it will devour anything it captures, even small-sized specimens of its own kind.

and the art of angling for it. The distribution of the species is largely controlled by the temperature of the water, and they constantly change their habitats to maintain the degree of heat most agreeable to them. "Their daintiness, shyness, cunning, and mettle," says Goode, "render them favorites of the angler, who lures them into

his creel by many sly devices. The most skillful fisherman is he who places before them least obtrusively the bait which their momentary whims demand, or a clever imitation thereof." In many places Trout become domesticated, and come as fully under the control of their owners or caretakers as do cats and dogs; this is



A TYPICAL TROUT STREAM

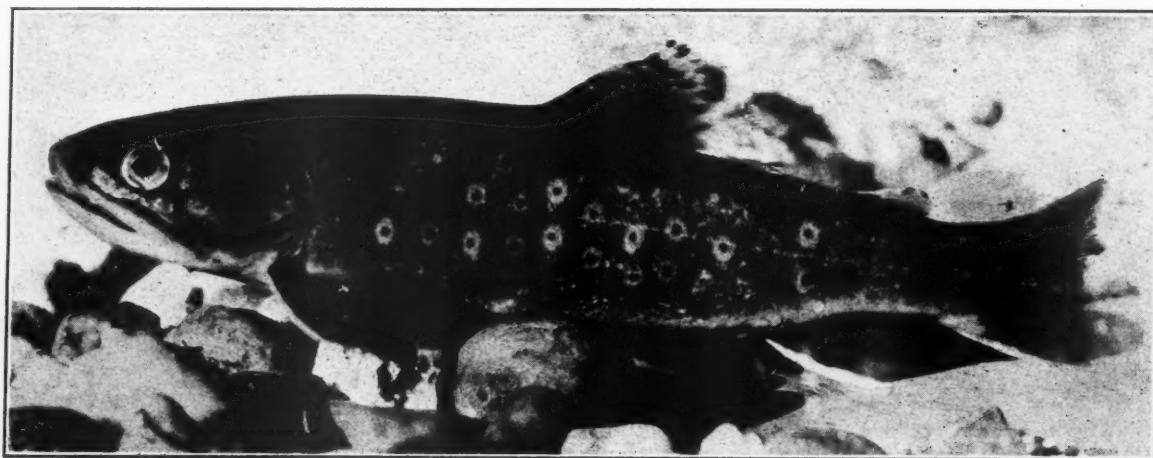
Figure 12. Brook Trout are often found in little inland streams, such as the one here shown, in many parts of the New England and Middle States, and trout fishermen acclaim the sport as the best that can be had with rod and reel.

largely practiced by fish-culturists in England—at least this was the case in earlier times, and it is fair to presume that it is still maintained.

Trout vary greatly *within the species*, according to the nature of the waters they inhabit, the variations being

teen pounds, while as a rule they do not run over three or four pounds.

Through the energies of the U. S. Bureau of Fisheries and similar establishments under the control of several of the States, many of our inland waters are kept abund-



THE BROOK TROUT

Figure 13. There is quite a long list of Trout that inhabit the streams and lakes of the United States; but among them all, no greater favorite than the Brook Trout. Brook Trout have often been kept in the aquaria of the United States Fish Commission at Washington, and here is a beautiful specimen of one photographed there by the writer.

manifested in their color, size, form, and fin-development. As to their weight, Mr. Hallock, a famous American fisherman, claims to have known of one that weighed seven-

antly stocked with this valuable game fish as they are, as a rule, captured by anglers everywhere, although by no means a regular fish of the markets.

BEWARE OF THE EUROPEAN SATIN MOTH

AN insect not heretofore reported in the United States has been found at the Medford and Malden line by the employes of the Metropolitan Park Commission. This insect is known as *Stilpnobia salicis*, or the Satin Moth of Europe. This name was undoubtedly given because the moths are pure white and the wings have a satin-like lustre.

Specimens of the caterpillars of this insect were brought to the Gipsy Moth Laboratory by Mr. A. N. Hubberly, Superintendent of the Middlesex Fells Reservation, with the statement that they were feeding heavily on poplar trees along the parkway. The insect was apparently not a native species, and proved to be the European species above mentioned. The center of the infestation is in the triangle at the Malden and Medford line bounded by Pleasant Street and Fellsway East and West. The trees in the Fellsway have been sprayed recently, but the caterpillars are now full-grown and many of them are entering the pupal stage. The full-grown caterpillars are about an inch and a half in length and of a yellowish color with prominent white blotches on each segment of the back, which makes them very conspicuous on account of the colors, and they are quite

different from any caterpillars that are found in this region. The injury to the trees is caused by defoliation by the caterpillar and the amount of damage likely to occur cannot be accurately measured at this time, as no areas are now heavily infested, though the insect was found in thirty towns north of Boston during a three-week period.

European writings indicate that this species attacks poplar, willow, oak and other trees and that it occurs in the British Isles, Italy, Spain, Germany, Southern Europe and Eastern Asia. The poplars have been eaten more freely than any other trees in the Medford infestation. There is danger, however, that this insect might seriously attack other valuable shade or forest trees if it becomes firmly established. The moths fly well and immediate efforts are being made by the Metropolitan Park Commission and the State Forester's Office to destroy as many of the caterpillars and pupae as possible, so as to prevent large numbers of moths emerging and heavy migration to adjoining territory.

The United States Bureau of Entomology will make a study of the life-history and habits of the moth and an attempt to determine the extent of the infestation.

WHAT IS RECREATION'S NEXT STEP?

BY ARTHUR II. CARHART

AMERICA is recreation hungry. The appetite of the public seems so whetted for outdoor play that to satiate it has become a Herculean task. Ten years ago going on a pack trip in the mountains was a hardship braved only by bolder spirits, but the taste for the outdoors has so developed among all peoples that girls and women, clad in sensible khaki outfits, are almost as generally present in the vacation camp of a pack outfit as are men. Auto trips of a thousand miles a decade past were material for feature stories in the newspapers. Today Bill Smith packs his wife, children three, tent, dog, skillet, fishing tackle and safety razor in the family gasoline chariot and goes, not one, but several thousand miles, visiting many cities, camps and playgrounds on the way. And the present time is not

the end of this chasing of the rainbow of recreation. Unlike the spectrum colored bow with its never-found pot of gold at the end the recreation lure leads one to true treasure. Health, happiness, knowledge, appreciation of God's outdoors, and a love of our own native land are but a few of the rewards for the man or woman who goes into the field of outdoor play to there be re-created.

Each year the numbers thus getting from under roof and outside of brick walls are greater. It is easily explained. Everyone who has once tried the life never quite gets away from its appeal and as a missionary converts others to try it just once. So every season sees the older gypsies on the road with an added number of converts.

Where is this leading us to? As a people, what will be the result? There is little need of speculation. No



THE MORE SPECTACULAR TIMBER-LINE LAKES OFTEN SERVE ADMIRABLY AS CLIMAX POINTS ON PACK TRIPS, AS WELL AS OFFERING EXCELLENT OPPORTUNITIES FOR THE ANGLER. THIS IS A BEAUTIFUL SPOT ON SNOWMASS LAKE IN THE HOLY CROSS NATIONAL FOREST IN COLORADO

one can make camp among the tall trunks of spruce or fir or stand on the top of a massive mountain peak without being the better for it. The magnificent mountain land, the lakes of the North, the great sweep of the ocean coast whether bordered by rugged cliffs or sandy beach all have some touch of the Infinite in them that, if he be kindred of Nature whatever, calls to man with an irresistible voice and makes him a better citizen, mentally, physically and spiritually for having lived in their presence even if only for a few hours.

Grant that recreation of this type is a thing good for the Nation; that every year will see a greater mass of people leaving their city environs to play in the woods,

especially adapted to outdoor play and right now is not too soon to start taking stock so we may have the greatest return from these areas without loss of effort, funds and scenic values.

Decided steps in advancing the organization of the recreation resources of the country have been made in the last four or five years. And these are the more encouraging because the thing that is most needed today in the field of national recreation is organization of planning, administration and development.

First among these is the organization of the National Park Service which has charge of the administration and development of the great areas within the borders of



A VACATION LAND WHERE YOU CAN UTTERLY LOSE YOURSELF AND FORGET THE WORLD OF MEN IS FOUND IN THE NATIONAL FORESTS. WITH PACK TRAIN AND GUIDE YOU CAN LOAF ALONG THROUGH FORESTS AND MEADOWS AND VISIT SCORES OF PLACES THAT WILL SATISFY YOUR LONGING FOR THE GREAT, UNSPOILED WILDERNESS. THIS IS A SPOT NEAR OBSERVATION POINT ON WHEELER TRAIL, ON THE RIO GRANDE NATIONAL FOREST IN COLORADO

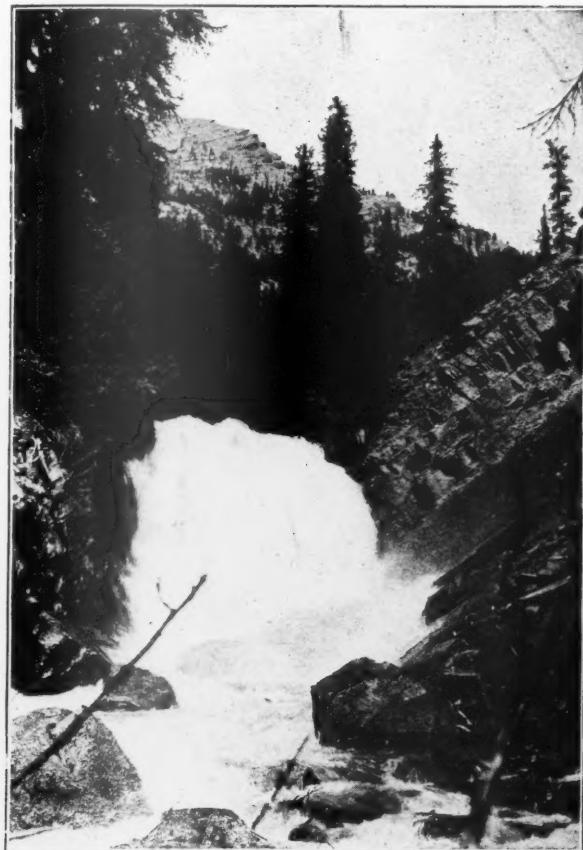
mountains, lake-lands and beach-places. Again comes the question: Where is this leading us to? Are we ever going to face a recreation famine?

The idea seems absurd. Some would believe it enters the sphere of the ridiculous. Today the putting of such a question would seem unwarranted. But scoffers not long ago said that our timber supply was inexhaustible. It was said also that our farm land was unlimited. Our coal supply was reckoned adequate for every need for scores of years to come. Today recreation stands in the same position that these other great National resources did some few years ago. It seems unlimited. But there is a limit to the recreational use of our great areas,

these national scenic centers. Under this head have been gathered together the many units which at present make up the system of National Parks and which before were without any centralized direction. This new Service is still comparatively young but its creation alone is a step forward.

Of no less importance is the advancement of the recreational use of the forests and its recognition by the United States Forest Service as a major use. Within the National Forests in such isolated tracts of small size as to not merit a separate administration are many spots of beauty equal to any found in other parts of the country. Besides these spots of exceptional beauty there

are many natural wonders such as caves, curious rocks and unusual waterfalls which are of sufficient interest to be preserved and protected so they may be capital stock of the scenic wealth of the nation. Further, there is but little of the great National Forest System which does not lend itself to recreational use. And the best feature of all in the case of the recreational use of forests is,



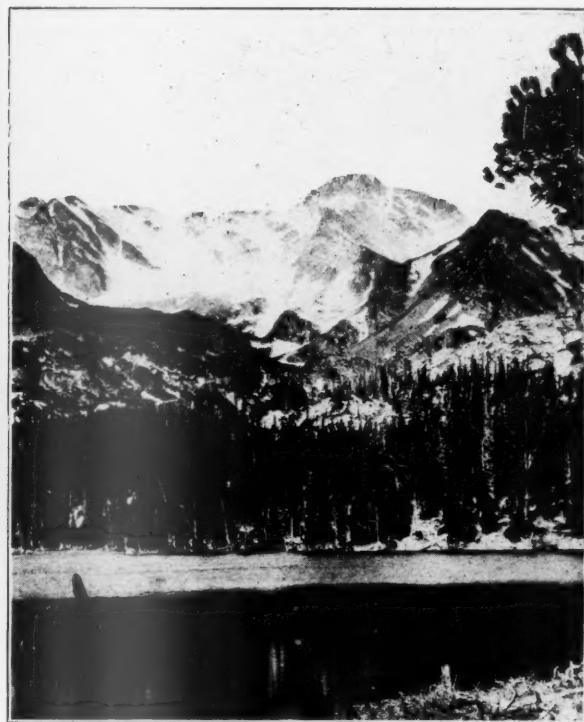
THIS UNUSUAL BIT OF WHITE WATER COMES TUMBLING DOWN WITHIN A QUARTER OF A MILE OF THE CABIN AT GREEN RIVER LAKE IN THE BRIDGER NATIONAL FOREST, WYOMING

there is but slight interference with any of the older established economic uses and the gain through the use is almost pure profit.

Here we have the two great capitular recreation resources of the country. In the case of the parks they are devoted to recreation alone. There is at the present time an unfortunate move in some quarters to reap commercial profit from the economic resources found within these great national areas. This move is diametrically opposed to the fundamental idea of the National Park System. These should be kept from the inroads of commerce for there is little question but that the loss in aesthetic qualities, the detriment to the parks, would far overbalance any gain to the nation from commercial exploitation and no individuals should be allowed to injure the parks for private gain at the expense of the public. The parks should be sanctuaries where nature

will remain supreme and the only development that is a rational one in these areas is a plan which follows good landscape principles in presenting the beauties of the park and that should be established only after a complete and comprehensive scheme has been carefully worked out by a competent artist.

As opposed to the park idea the recreational use of the National Forests is not paramount but coincident. The economic uses progress without interference on the part of recreation except in unusual cases. Actually this added use to the ones established in the forests helps the older ones in many ways. Roads built for recreation also serve in opening new timbered areas, reaching isolated homesteads in the forests in allowing fire patrol to reach hitherto remote fire hazards and in administration of the forests. The reverse is as true. Roads built for any one of the economic uses serves too for recreation. There will be no interference with economic



GOOD PLANNING OF RECREATIONAL DEVELOPMENT WILL UTILIZE ALL RECREATION VALUES SUCH AS ARE FOUND AROUND THIS LITTLE LAKE IN THE COLORADO NATIONAL FOREST WITHOUT LOSS OF ECONOMIC RESOURCES

uses in the forests on the part of recreation except where greed may attempt to destroy beauty and scenic wealth which is of so much greater aesthetic value than commercial value that the loss would be wholly unwarranted.

But the recreational use of these two great systems follows almost identical fundamental principles. The recreation found in the forest, that is just without the boundary of a park, is of as great value as that found across the imaginary line. But the forests are in the Department of Agriculture and the parks are in the

Department of the Interior. The simplest manner of bringing these two services under one executive head would seem to be to place them both in the same department. But at present they stand in separate organizations. With all of the good will possible under the circumstances, with all of the desire to co-operate that may be present, the functioning of the recreational work of these two departments cannot be as well correlated as though there were some central policy-making body of single executive group that could organize the recreation of the nation without regard to map lines, with no consideration of imaginary boundaries and which would think primarily of returning the greatest aggregate recreational wealth to the nation and the world that is pos-

problems extending from the most compact of home grounds to the organic plan of whole cities, park systems and the organization of a schematic development of entire regions. There is no question but that the American Society of Landscape Architects, the official organization of the profession, would lend all aid that is necessary to put the planning and development of our national recreation system on a sound basis.

The foresters as represented in the Society of American Foresters and the American Forestry Association could give inestimable assistance to the forming of a recreation policy and system which is to grow up in the areas which will in most cases be found to have forest cover. There is little question but that the most enthusi-



A LAKESIDE CAMP UNDER PERMIT IN THE PIKE NATIONAL FOREST IN COLORADO. A REALLY SUBSTANTIAL CABIN, WITH A BRICK FIREPLACE, ASSURES COMFORTABLE HOUSEKEEPING AND ONE CAN LOOK FORWARD TO LONG DAYS OF PLEASURE AND NIGHTS OF INVIGORATING REST IN ONE OF THE MOST BEAUTIFUL OF THE NATIONAL FORESTS

sible from our magnificent areas in the National Parks, Forests, Monuments and Reservations.

Would it not then be a further step forward if there were to be formed such a body with any power that seems fit to organize this recreation resource of the nation? There are a number of organizations of national scope that would lend their support to any such move. The best talent in the land could thus be brought into consultation on the problems facing the recreation organization insuring the best possible development. And this group could continue to function as an advisory body in the event the two services were at some time placed in the same department.

Foremost of all, the professional landscape architects of the country have a deep interest in the development of our national recreation grounds. Fundamentally the art practiced by this group has to do with the fitting of earth surfaces to human use, the magnitude of their

esthetic kind of support of a plan for general organization of recreation would come from members of this profession.

Engineers are needed to aid in those problems which are primarily based on engineering. Roads are to be built, sanitary systems are needed at many points to safeguard health and many technical engineering problems will be present. Engineers wherever they may be are ever progressive and their support as represented in the many national societies may be counted on.

The architecture which will be found within these areas serving the public is as much in need of the skill and artistry of the architect as the forests of the forester or ground surfaces and covers need intelligent planning by landscape architects. By all means there should be architects in such a group as may be formed and the National Society should be counted on for the same strong support as the other professions.

In those professions named are found the principal ones which have to do with the planning and development of the areas which are adapted to recreation. There is another group that should have ample representation. They are the commercial men, who, after a scheme is worked out by competent artists and engineers, take hold of the running of the organization which is to make the plan function.

The executive phase of this work should be represented by men that have had experience in the work. Hotel men, transportation men, advertising men and those pioneer spirits who have been in charge of the first "tourist bureaus" of the country should be heard in this national recreation organization.

One is as necessary as the other of these two groups. If the professional men would not turn out a good working plan there would be little use of the commercial group taking charge of it. And if there were not the men to take over the organization and running of a scheme so that it would properly function there would be little use of making a scheme.

The discussion of the organization of our recreational resources could go on and take up the developments which some states have been able to accomplish in their parks and forests. This system within the states, secondary in magnitude only to the great areas of the nation

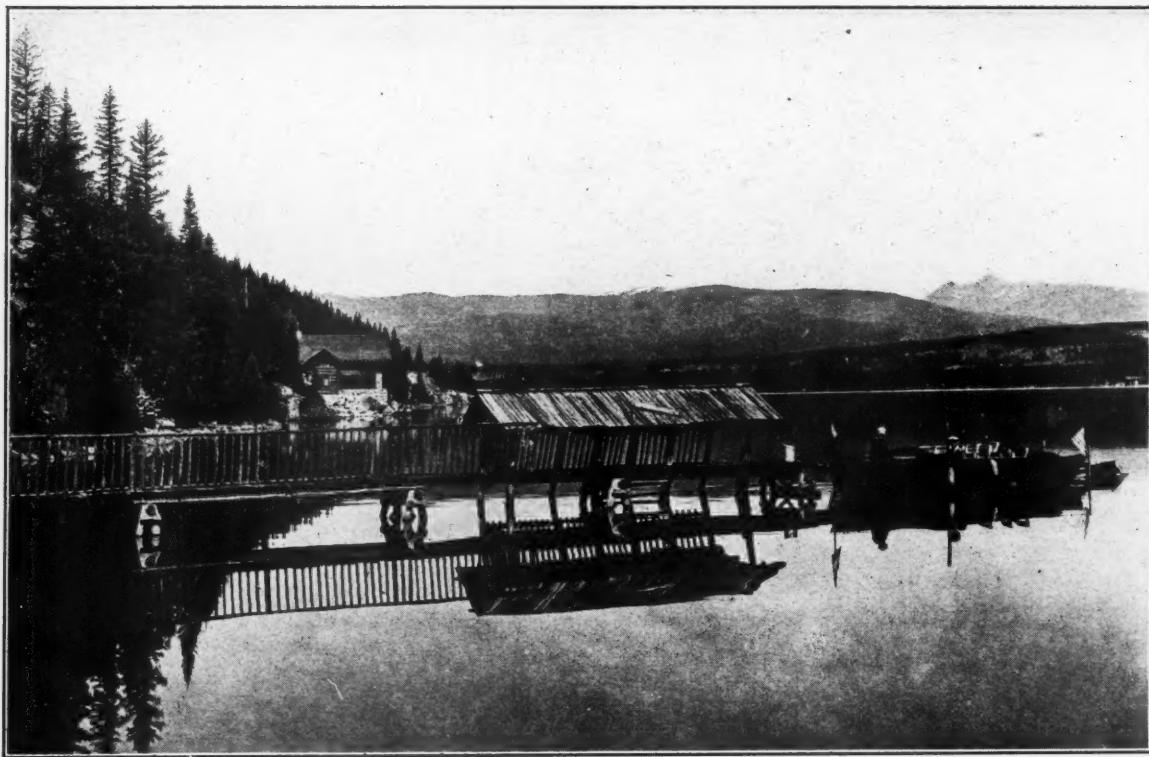
and equal or surpassing them in use is as potent a factor in national life as those great systems mentioned earlier. And more than ever is there needed here some guiding light for the men who are trying in the several commonwealths to organize the best recreational territory there is in the state for the use of their citizens. A national commission would serve as an inspiration and model for the state organizations and the good council of the national advisory body could be extended to aid the states.

Of equal importance although of lesser size are the county parks. So far the county system has been established in but few localities but where such has been the case the development has justified its existence. This group of public grounds rounds out what might be termed the national recreation system.

Today what is needed most is good sound judgment and true artistry in planning and an organization which will back up that judgment and artistry so that it becomes living facts. The general recreational use of the great outdoors is upon us and the first wave has but touched the great areas of nation, state and county. Far in the future may come a time when there will be no place which will offer the type of recreation we can now offer in our national system. Are we then truly facing a future famine in recreation? The answer lies in what happens in this field within the next decade. With



GOOD ROADS AND A UNIFIED TRAFFIC SYSTEM ARE NEEDED IN ANY RECREATION SCHEME. ROADS BUILT FOR RECREATION ALSO SERVE IN OPENING NEW TIMBERED AREAS, REACHING ISOLATED HOMESTEADS IN THE FORESTS AND ALLOWING FIRE PATROLS READY ACCESS TO REACH REMOTE SPOTS QUICKLY AND EASILY. THIS ROAD OVER COCHETOPA PASS IN COLORADO IS A GOOD EXAMPLE



MANY DELIGHTFUL TRIPS MAY BE TAKEN BY MOTOR BOAT—TO THE INDIAN CAMPS ALONG THE BANKS DURING THE BERRY SEASON, TO BEACHES WHICH LURE ONE TO TAKE A DIP IN THE CLEAR WATERS OF THE LAKE, OR TO FISHING GROUNDS THAT HOLD FIGHTING GAME FISH OF LARGE SIZE, ADDING ZEST TO THE LIFE OF THE SPORTSMAN

proper planning and far-sighted policies established we will be able to meet the oncoming years without any chance of not satisfying our demands for recreation. Only through unorganized conditions and ill founded plans can we lose our great heritage in the scenic wealth of our land. But this wealth is so easily dissipated through what is often believed to be and mis-named development that the time may easily come when there will be no last wilderness where one may go to view God's handiwork without the chance of viewing also a hideous structure or the marring of scenic beauty by the grossest commercialism.

Now is the time for the beginning of an amply organized, properly planned, well executed system of national recreation. Today we are but partly organized. There is a lack of correlation of all agencies working toward the development of this resource. There is a lamentable lack of competent artistry in these developments.

Never again will there be the opportunity to start with so few mistakes made as at present. The great untouched wealth of many areas but remains to be planned and developed to offer recreation, health and joy to thousands. The movement to the outdoors has no more than started and ten years hence will see all forces scrambling frantically to stay ahead of the tide unless count of the future is taken today.

Are we facing a new kind of a famine—that of available recreation? Yes and no. Yes! If we do not now start to fully organize and adequately plan for the

future developments and now systematize our present efforts. No! If we can start now to look far into the future when the population of our country has perhaps doubled and people demand governmentally owned open spaces where they may go each year to live their vacation time. No! If we can but see the vision and now start a really comprehensive plan for each unit within the national system and as well an ordered plan for the whole.

Many men of great vision and ability stand ready to help in any plan for the betterment of our recreation system. Today we have unexcelled material for such a system based on the great National Forests, Parks, Monuments and Reservations. State and county parks are being developed in widely separated regions heralding a day when they will be universal. The future promises a use of these areas that today can be but conjectured. Are we going to make the most of this opportunity and meet the coming demand? Will our recreation areas meet the exacting requirements in the future or will people longing for outdoor life have to continue to live hungering? Correlation, organization, well founded and artistic planning and vision can solve the problem and the foundation stands today waiting for master builders to rear thereon a structure of splendid proportions which will give our land for all time a truly national recreational system. Proper action now assures the future of such a system that will be more than ever in the coming years a national asset of inestimable value.

THE USES OF WOOD

WOOD'S PLACE IN THE HONEY INDUSTRY

BY HU MAXWELL

THE forest holds a place of two-fold importance in the honey industry. First, the bloom of trees constitutes a valuable pasture whence bees collect honey; and, second, the wood derived from the forest supplies most of the material of which hives, frames, stands, boxes, houses, and other appurtenances, are made. This holds true of few other industries, for it is unusual that a tree supplies a product and also supplies the receptacle in which the product is placed for storage or for shipment. It is proper that wood be given due credit for the contribution it makes in both of these lines.

Scientists have made a closer study within the bee hive than in the home of any other creature of animated nature, for the reason that the habitation is a combination of the home and the workshop. The inhabitant lives in it and works there, and those who wish to investigate the labors and social habits of these industrious workers must peep inside the hive and there glimpse the remarkable activities of these wonderful insects which have amused, instructed, astonished, and fed some of the wisest of the human race. No other creature works so hard and so persistently for man, and few others so well repay care and good treatment. But it is not the purpose here to praise the bee or to dilate on its remarkable worth as a teacher and a worker; rather it is the purpose to speak of the uses of wood in providing for the wants of the bee and at the same time for the wants of man. Doubtless the earliest wild man that made the discovery that honey was good to eat



BLACK CHERRY

These dainty sprays of sweet bloom are special favorites of the bees.



THE BEEGUM OF THE PIONEERS

This is a section of a hollow cottonwood log in which bees are storing honey on a Kansas farm. It is a relic of former days and is fortunately going out of use. (Photograph by Frank C. Pellett, Hamilton, Illinois.)

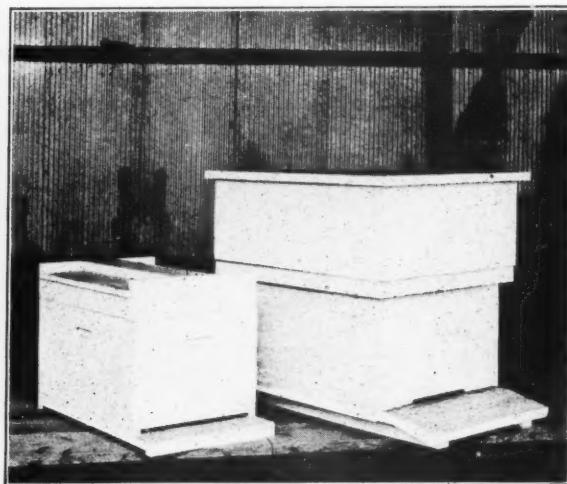
was well stung for his pains, but the vicious sting of the bee never afforded complete protection against robbers, though it is generally ample protection. So tempting is the sweetness, that a painful sting is necessary to safeguard it from all manner of marauders.

It is believed that the earliest food store laid aside for his wants by man, and which is still in existence, is a jar of honey found in an Egyptian tomb, and probably placed there for the sustenance of the dead during the journey across the Stygian River. When found, the honey had changed into a very dry candy and it had lost its sweetness, though it could still be identified as honey. As a side issue it may be stated that

in the bottom of the jar, well covered with honey, was a dead flea of precisely the same sort as those which plague Egypt to this day. Apparently, the insect had hopped into the jar while the last rites over the dead were being observed, and when the jar was corked, the little fellow was shut up within, and, like the true patriot, he probably could have declared that death was sweet. Anyway, he sank to the bottom while the honey was still soft, and there the archaeologists found him after a good many thousands of years.

Bees are naturally wild, and have been tamed by man who has provided homes for them in exchange for the food which they furnish him. If he relaxes his care and attention, they speedily relapse into a wild state, and often they elude him and fly away in a swarm, and to all intents and purposes they are as wild as their ances-

tors were before they first made the acquaintance of men. A swarm bred and reared in the highest civilization, will escape and take up its abode in a hollow tree or in a hole under a rock, or in a crevice in the face of a cliff, and there the bees set to work to store honey for



UP-TO-DATE BEEHIVES

This shows the latest and most approved home for bees where safety and comfort are provided for the industrious workers. Extremes in hive construction, the large Dadant hive and the small Langstroth hive, show comparative sizes. (Photograph by Frank C. Pellett, Hamilton, Illinois.)

their own wants, and they appear not to miss the care and attention of men. In a forest, wild bees nearly always find hollow trees for homes and as storage places for honey, but in some regions, they use holes in the ground. Man makes shelters, hives, and other appliances of wood when he provides for his bees. For these purposes nothing is better than wood. It has all the good qualities and few of the bad. The more highly the bee business is developed, the greater the use of wood and the more carefully the wood is prepared for the various places in the industry which it is expected to serve.

It was formerly customary in this country to provide hollow logs for hives, which were called gums. The logs were crosscut into lengths of two or three feet, and the receptacles thus provided were stood on end in some out-of-the-way place, and a board was nailed on the top of each gum for a roof, and it was ready for the home coming of the swarm of bees which was to make a domicile of it. Frequently the hive stood out of doors with no covering other than the board on the top. The

gum contained no partition, no loft, no basement. The bees stored their honey in it, fastening the comb to the dirty walls, and there they worked in the dark during the whole season, provided they were not eaten out of house and home by moths, mice, and other enemies. All the ventilation they got was what they provided with their own wings, fanning the air in by efficient team work, arranging themselves in long rows for the purpose and working their wings for fans.

When the owner came round in the fall of the year for his share, after the work of the bees for the season was over, he pried the board from the top of the hive, scooped out a few pails of honey, guessed at the quantity he was leaving for the swarm during the coming winter, and nailed the lid on again. If the bees did not starve or freeze during the winter, they began in early spring to fill the old gum again, preparing another haul for their inconsiderate owner.

Bees do not hibernate, as most insects do, and they must have food and warmth during the winter, or they will perish. They provide food enough, if permitted to retain a fair portion, and their bodies furnish sufficient heat, if the hive is protected in a measure against extreme cold.

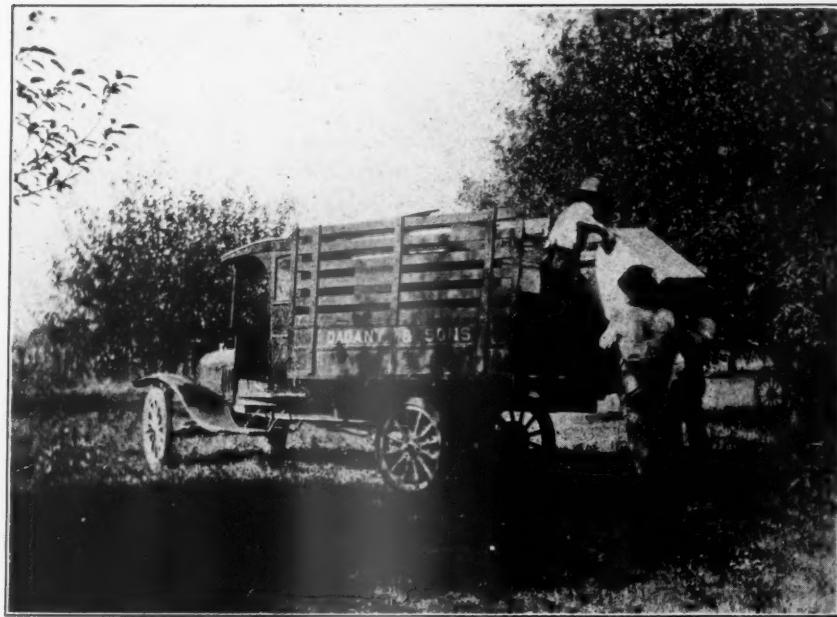
The world has seen many strange sorts of bee hives. A lion's dry skeleton answered that purpose, as is inferred from the famous riddle propounded by Samson to his enemies. Pictures in old almanacs represent hives built of straw rope, wound round and round, narrowing to the top, and shaped like Eskimo huts. Such hives belonged in Europe where some of the people called them "bee baskets;" but they never had much of a foothold in America, where nearly everybody used wood in some form. During early times in the southern



A BEEHIVE IN SOUTHERN TEXAS.

The bees took possession of a common box with one side wholly open and proceeded to store their honey in it. This is a freak hive and is not common, but it shows that the little workers are easily satisfied. (Photograph by Frank C. Pellett, Hamilton, Illinois.)

states hollow cypress knees served as bee hives on some of the plantations where negroes had charge of the bees and saw to it that the honey was periodically collected and made use of. Similar cypress knee hives were in use in southern Illinois in 1820, as is learned from the book of an Englishman who traveled in America during that year. The cypress knee is a peculiar growth or excrescence rising from the roots of the tree where the ground is covered with water most of the time. The knees are slender, hollow cones six inches or more in diameter at the base and tapering to a point. The largest may have capacities of six or eight gallons, or even more, and bees accepted them as domiciles, if placed within reach. They were rather poor excuses and were less convenient even than hollow logs which were often used side by side with the knee hives. As the hollow log gums and the cypress knees went out of use they were succeeded by a bee hive made of boards nailed together to form a box, which was a little better than the hollow log; at least, it looked better. The next improvement consisted of a little box set on top of the large one. The top box was called a "cap." The bees



TRANSPORTATION PROBLEM SOLVED

Loading hives of bees at the Dadant apiaries near Hamilton, Illinois, for a thirty mile haul. Five hundred colonies were hauled on trucks and in 1919 they produced twenty tons of honey. Everything is up-to-date. (Photograph by Frank C. Pellett, Hamilton, Illinois.)

filled it with honey after the hive was full—sometimes before. The owner took the honey in the cap, as his portion, and left the swarm in possession of that in the main hive. A vigorous swarm in the climate of the northern states wants thirty pounds or more of honey as the winter supply, but a little less will do in the South where the winters are shorter. When the owner took one cap he set another in its place, if he believed that the swarm could fill another before the close of the season, and thus he doubled his share.

Bee keepers now do much better than formerly for their faithful workers. Decent hives are provided for the swarms, and the larger amount and better grade of honey received pays well for the attention bestowed on the workers. Frames which are sometimes called honey boxes, are made for the comb, each frame four or five inches square. One fits beside another in such a way that when one set of frames has been filled with honey, they can be lifted out and empty frames can be inserted in their places without disturbing the others. This arrangement is advantageous in more ways than one. The clean, fine squares of honeycomb may each be handled



BEE BUSINESS WELL CONDUCTED

This is a Kansas scene and shows how bees are cared for by the owner who takes pains to provide for the safety and comfort of his bee workers. Hives are made of high class wood. (Photograph by Frank C. Pellett, Hamilton, Illinois.)

separately without the loss and waste that was inevitable when the honey was cut and torn out of the old style hives.

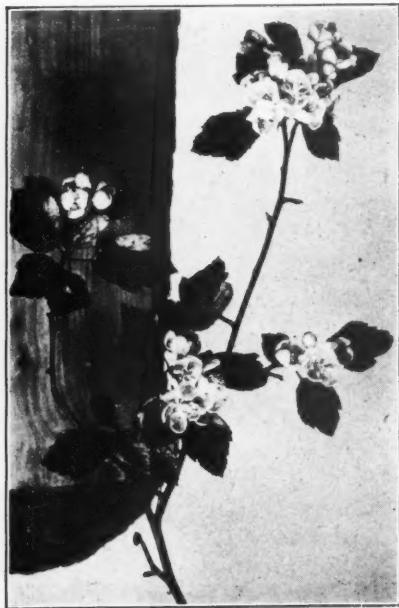
Machines have been invented and put to use by which the liquid or rendered honey can be removed from the comb without breaking it, and when thus emptied the

frame and the comb may be replaced in the hive ready to be filled again, and thus the same comb may be used two or

those suitable for honey frames. White pine is a favorite wood for hives, but many others are in use, both softwoods and hardwoods.

Bees make full use of the forests. No class of workers derives greater benefit from the trees and their products. To begin with, the hive and most of the apparatus of the honey business is of wood. Bees live in wooden homes in most instances, and have always done so, whether those homes have been hollow trees or hives made of lumber. They resort to the bloom of plants for honey and for the wax with which they build their comb, and also for the special food which plays so vital a part in the hive economy. Bees collect a little honey from sources other than flowers, but not much; and what they take from other insects, mostly originates in flowers, even if the bees do not take it firsthand from the bloom.

Bee raisers who engage intelligently in their business must be well acquainted with the principal sources of honey, but the honey resources are not the same in all regions, nor is the honey made in one district always of the same quality as that made in another district. It depends on the sources of the honey. Persons accustomed to the honey of the Allegheny Mountain region often express disappointment when they taste that produced in the prairie country where a wholly different kind of pasture supplies the bees. The tree bloom of the



THE WILD CRAB

Blossoms most beautiful and fragrant, and in May time, when the flowers are at their best, they attract the bees by the hundreds.

more times. The bees are thus spared the labor of making new comb and can devote their whole energies to honey making. It is believed that the manufacture of comb involves as much work on the part of bees as the gathering of the honey that fills it, and the use of the same receptacle a second time is economical. Comb manufactured of aluminum has been found practicable and manufacturers of bee supplies advertise it, but the use of aluminum comb promises neither to increase nor diminish the use of wood in the honey business.

The small frame in which the bees build their comb requires little wood. Perhaps a cubic inch suffices for a frame, for the stock is quite thin and the strips are little more than an inch wide; yet, in the aggregate, a rather respectable bill of lumber is required to supply bee keepers with honey frames for a single year. A wood of white color and light weight is wanted, and basswood is one of the best, but pine, yellow poplar, spruce, and cottonwood are in demand, particularly that species of cottonwood known as balm of gilead. The number of woods suitable for hives is larger than are

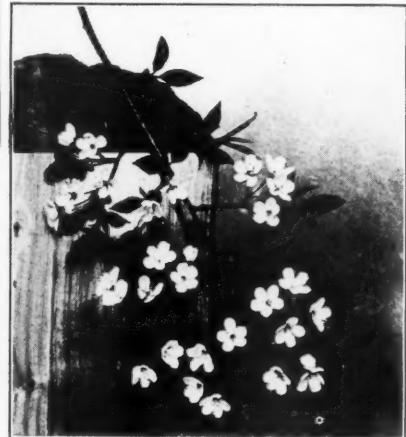


THE INDUSTRIOUS BEE KNOWS THIS FLOWER WELL

Wild cherry bloom, and the bloom of tame cherry, too, for that matter, may be listed with the most reliable pasture for bees, provided the supply of trees is not too small. The tree blooms profusely and at a time when bees are very anxious for the harvest.

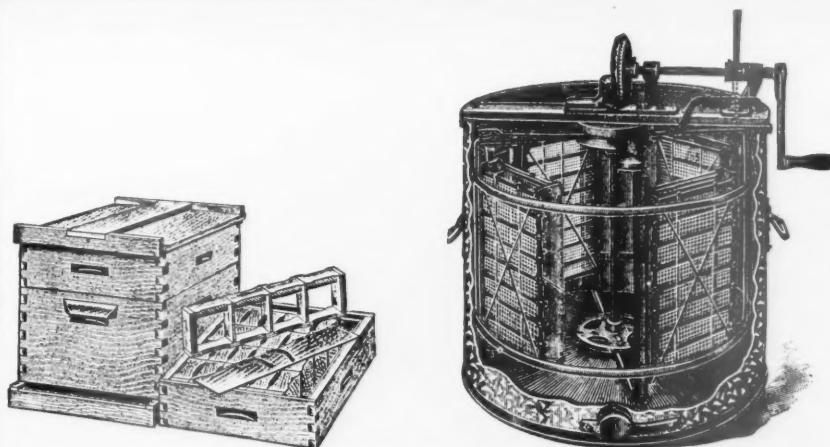
mountains imparts a richness and flavor to the honey made there that is not recognized in some regions where the bees

have resorted to other sources. Most flowers furnish something to the bee, and no small part of the annual crop of honey comes from plants which live but a single year, or which, at least, spring up each year from the roots. But the industrious insects work the same trees year after year. Of course, the same bee never works the same tree or plant the second year, for the working



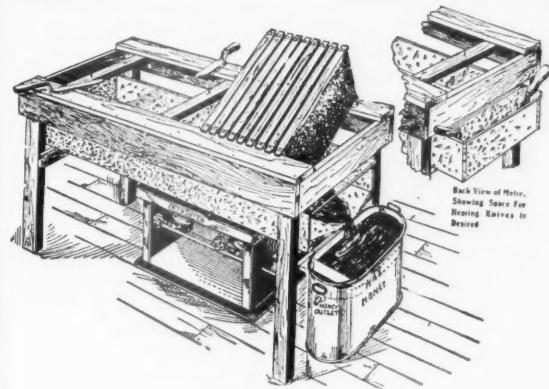
THE WILD PLUM

The bees love the beautiful white blossom sprays of the wild plum.



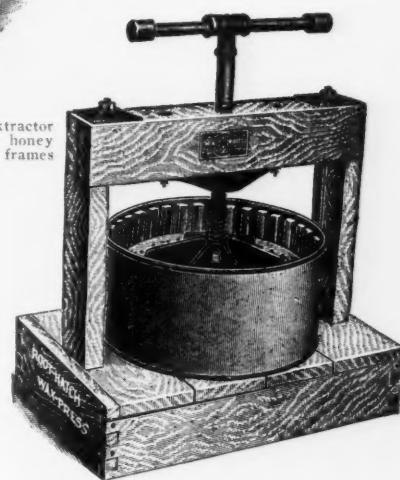
APPLIANCES FOR HANDLING HONEY

This illustration shows a modern beehive ready for the reception of bees, and beside it is an extractor for removing honey without breaking the comb. By revolving the honey frames rapidly, the honey is thrown out by centrifugal force. The frames are of wood, and so is the hive in which the frames are placed.



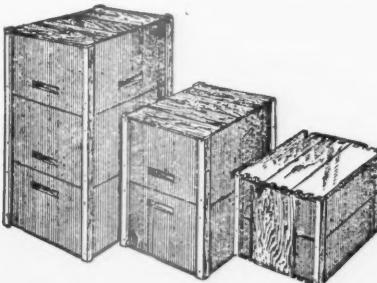
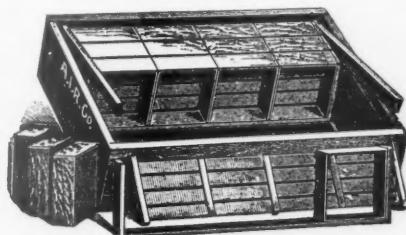
SUPPLIES FOR BEE-KEEPERS

The keeper of bees turns to wood for many of his supplies in addition to hives. Here is shown the outfit for removing honey and comb. Shipping boxes are of wood also, and are made in particular patterns and in special sizes to meet the needs of the trade.



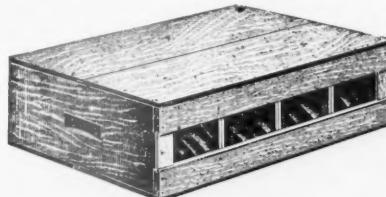
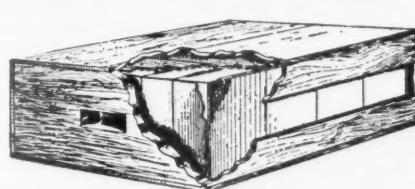
EXTRACTING HONEY AND PRESSING WAX

Here is shown the bee keeper's arrangement for extracting honey. The regulation press for reducing the comb to solid cakes of wax. Profit in bee-keeping depends upon saving the wax as well as the honey. Both are in large demand.



PACKING BEE SUPPLIES FOR SHIPPING

Not only are bee hives and other supplies made of wood, but the packing and boxing for shipment are likewise done with wood. Wooden crating is more convenient, more dependable, and less expensive than crating of any other kind, and wood is nearly always used when shipments are made.



PROTECTING HONEY DURING SHIPMENT

The insinuating ant lies in wait at all advantageous points ready to make raids on shipments of honey, and as a precaution against that danger the cases in which the honey frames are packed are made insect proof by matching and joining the lumber of which the packing cases are made. The protection thus afforded is ample.

bee's life usually does not extend into the second year. Without forest flowers bees would often fail absolutely in their work, and could not lay up enough for the following winter.

Apiairists make charts of "bee pastures," meaning thereby the area and flora which supply the workers. Few hardwoods fail to contribute a generous share to the hive's store, for most hardwoods are rich in bloom and the bloom is rich in honey; but some are worth more than others as bee pasture. The more abundant the hardwoods in a region, the better honey district it is likely to be. The task of picking out the best honey trees would be difficult, because several have claims well supported by evidence; yet if all things are taken into consideration, it would probably be found that basswood is at the head of the list, or at least so near the head that it would not be easy to name a tree entitled to a higher place in the estimation of an industrious bee. In some European countries the linden is planted and maintained as bee pasture. Our basswood with its three species and at least one variety is the American representative of the European linden, and in recognition of that relationship, we sometimes shorten the name to linn, lin, or lyn. The three American basswoods are all luxuriant bloomers, and their flowers are among the few that are workable by bees in wet weather as well as in dry. The peculiar arrangement of

the leaves on this tree produces a sort of thatch by the overlapping of the edges, and this thatch shelters the bloom and keeps it dry during showers which dampen all else. If a bee is overtaken by a sudden rain and can fly under the umbrella-like shelter of basswood foliage, it is safe from the rain. After the shower has passed, and while all other leaves and bloom are wet, the bee can work the dry bloom of the basswood, thus losing little time and finding new opportunity. It is not certain just how this peculiar leaf canopy is taken advantage of by bees in rainy weather, but there is reason to believe that the situation is well understood by them.

Among some of the hardwood regions, bee keepers claim to be able to pick out from a full hive the combs which are filled with basswood honey. They judge by the color and also by the taste. In their parlance it is known as "poplar honey." Basswood has an undisputed place in importance among wild trees as a source of

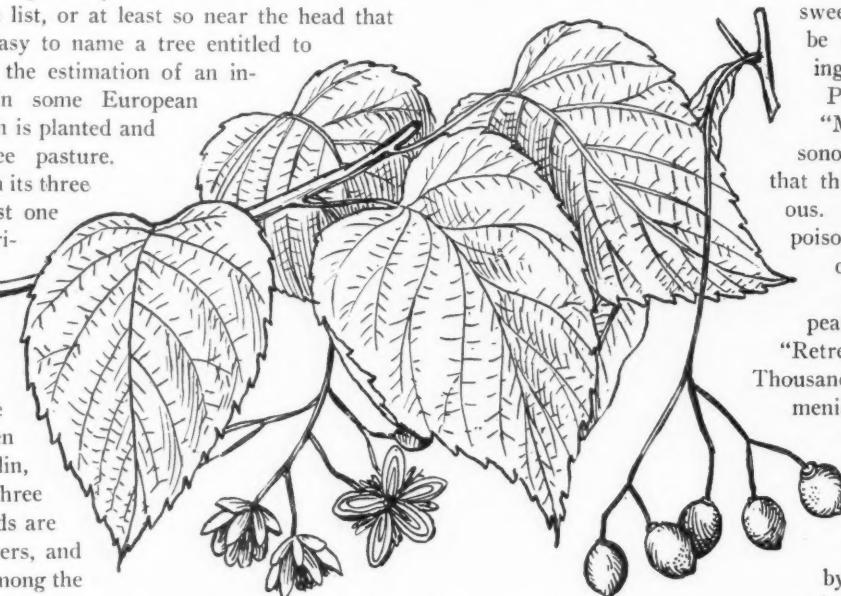
honey, but it is only one of several good sources which bees are able to make use of among the trees of the forest. Yellow poplar is visited quite eagerly by bees, but this species blooms less luxuriantly than basswood. Sourwood, which is known also as sorrel tree, sour gum, or lily of the valley, is not abundant in the forests, but wherever a tree is found in bloom, there will bees be found also, busy with the small, bell-shaped flowers. The tree is found in most of the country east of the Mississippi River, except in the extreme northern part. All four of the sumacs, including the poisonous species, furnish loads of honey for bees. All of the locusts are rich in nectar, and during their brief periods of bloom, the buzz of bees may be heard about the showy flowers. The flowers of yellow or black locust are so filled with

sweetness that it may be tasted by chewing the bloom; but

Pammel, in his "Manual of Poisonous Plants," says that this honey is poisonous. The subject of poisonous honey is an old story and has been often repeated. During the "Retreat of the Ten Thousand" through Armenia, as the account is given in Xenophon's "Anabasis," the soldiers were poisoned by partaking of native honey which had been made by bees pasturing on a laurel which grows in that country. Centuries after that time the Romans, remembering the experiences of the Greek army under Xenophon, refused to receive the honey from Armenia, fearing poison. The flowers of our kalmia laurel and also of the rhododendron, are reputed to yield poisonous honey; but since bees collect it and store it, and as no well authenticated case seems to be known where persons have been poisoned by eating laurel honey, it would appear that the honey cannot be very dangerous.

Among the other trees considered valuable as producers of honey in this country are holly, judas tree, the maples, black gum, chestnut, willow, service, and fruit trees of most varieties, but particularly apple, peach, plum, and cherry.

It is well known that too much honey is not good for the health and that a diet of honey is apt to cloy in a short time. The claim is made, however, that if it is eaten in connection with milk, that is, a mixed diet of milk and honey, the undesirable effects are not noticed.



BASSWOOD BLOOM FOR HONEY GATHERERS

Perhaps no other blooming vegetable genus in the world furnishes bees with so much honey as basswood, which is known in Europe as linden, and in some parts of America as lin. The tree grows in nearly all parts of the eastern half of the United States, and it is frequently found in great profusion.

THE FIRST ALGAROBA TREE IN HAWAII

BY C. S. JUDD, SUPERINTENDENT OF FORESTRY

NO introduced tree has been of greater benefit to the Hawaiian Islands than the algaroba (*Prosopis juliflora*, D. C.), one of the mesquites, or kiawe, as it is locally called. It is also known as the honey locust, honey pod, cashaw, and July flower, and our name for the tree of algaroba comes from "Al-kharrubah," the Spanish name of the carob tree, or St. John's bread, the pods of which it resembles in flavor. The native home of the algaroba is from California to Texas and through parts of Mexico, Central and South America, as far south as Buenos Ayres.

While the history of its introduction to Hawaii is not definite, the conclusion seems to be that the first tree planted in the islands was raised from seed brought by Father Bachelot when he started out from Bordeaux in the early part of 1827 on his first trip to the Islands, and that the seed came from the Jardin du Roi de Paris and not from Mexico or Chile. This original tree was planted by Father Bachelot in December, 1828, in the north corner of the Catholic Church yard in Honolulu. Certainly, no man could have left a greater or more abiding monument, for the algaroba now covers vast areas on the different islands of mostly stony, arid, and precipitous land, which formerly was utterly worthless for other purposes.

The original tree is still growing on Fort Street, near Beretania Street, and although it was severely topped in 1906, to make room for the Fred Harrison block, it has today a diameter at breast height of 3 feet 3 inches, and is still good for a great many years. The accompanying illustration shows the tree when it was in its full splendor about twelve years ago.

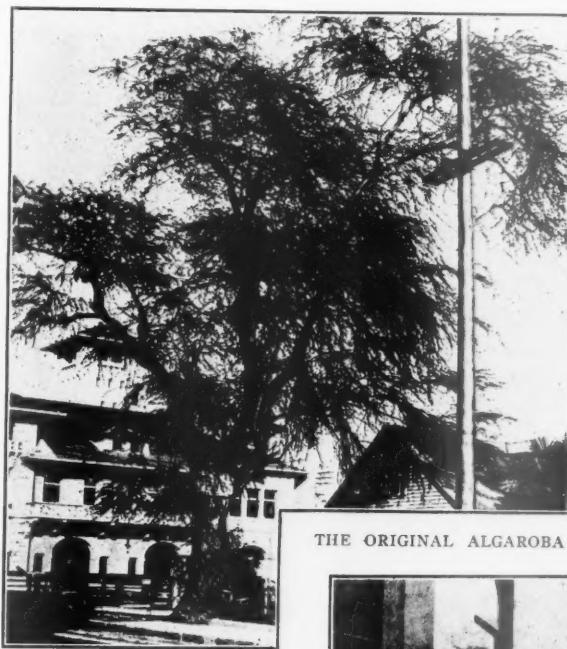
The value of the algaroba in Hawaii has been enhanced by the ease with which it can be propagated and its ability to grow in arid regions. The tree belongs to the leguminous family, and begins to bear pods when six years old and even younger. These are eaten by

stock, but the small, horny seeds are not crushed while passing through the alimentary system but rather are prepared for quick germination by the action of the digestive fluids. The spread of the tree in these islands has, therefore, been due solely to stock and by this means the algaroba has become a wild forest tree. It is estimated that it would have cost at least one million dollars to plant by human agency the 80,000 odd acres in these islands which have been covered with more or less density by algaroba forests. And this wonderful and comparatively rapid spread of the tree has been accomplished without the expenditure of one cent for planting.

The algaroba in Hawaii seems to excell in growth the tree in its original habitat. In Arizona, trees 75 years old are from 10 to 12 inches in diameter, and near Tucson trees measure 3 feet in diameter at the ground and 50 feet in height. On the Punahoa grounds a tree not yet 70 years old measures 41 inches in diameter at breast height and 85 feet in height, while trees on the Dillingham place, which are 50 years old, average over 2 feet in diameter. The tree in these islands is a comparatively rapid grower, and takes hold of waste land in a surprising manner. It has few natural enemies; the caterpillars of two introduced and very common moths affect the bloom and occasionally reduce the size of the bean crop, and the grubs

or four beetles bore into the sapwood of dead or felled trees.

The uses of the tree, in addition to being a forest cover for waste land, are too well known to need much elaboration here. The following, however, are some of the



THE ORIGINAL ALGAROBA



AND ALL THAT IS LEFT OF IT

main products of the algaroba and the chief uses to which it is put in Hawaii.

Wood for fuel, charcoal, timbers, and posts.

Pods for fodder in their natural state and crushed into meal.

Blossoms for bee pasturage.

Trees for reclamation of waste land, ornament, and shade.

Young trees for hedges.

The wood of the algaroba is a dark reddish brown in the heart, is as heavy as and harder than ash, elm, or white oak, but not so strong or elastic. For fuel it is equal, cord to cord, to hickory or white oak. Its durability is highly in its favor, and the heartwood used as fence and foundation posts will last in the ground for a great many years. The sapwood is a clear yellow and

is apt to be riddled by borers if not used soon after cutting. The smaller wood makes excellent charcoal, while in Honolulu the best quality of fuel wood sells for \$14 per cord in enormous quantities annually.

The honey industry in Hawaii is dependent almost entirely on algaroba blossoms, and the clear honey product is most delicious. The exports of honey and beeswax from the islands in 1915 were worth \$49,169. The value of waste land has increased manifold on account of the algaroba, and what would Honolulu be without the algaroba as a shade tree? The young plants, set thickly together, have been successfully grown as hedges which are quite protective on account of their thorns.

A boon to stockmen, the standby of the apiarist, and the chief support of the wood dealer, the algaroba has well earned its place as the most valuable tree in Hawaii today.

THE CHESTNUT BLIGHT IN THE SOUTHERN APPALACHIANS

BY G. F. GRAVATT

IN 1904 the chestnut blight, a fungus importation from Japan and China, was recognized as a serious disease around New York City. Since then the disease has spread steadily from New York as a general center, rapidly killing the chestnut trees.

The chestnut growth of northern Virginia and of the three northeastern counties of West Virginia in 1915 had numerous spot infections of the bark disease but it was not generally infected. A brief inspection trip in the fall of 1919 showed that the chestnut growth from Nelson County in central Virginia northward to Washington, D. C., and westward to a line running through Albemarle, Green, Rappahannock, Frederick and Hampshire Counties, had an average of 5 to 15 per cent of the trees killed by the disease and 90 per cent of them infected. The infected trees will die in a few years. This is a general average for the above section as some tracts of chestnut timber have a large per cent of the trees infected and dead, and other tracts a much smaller. The most southern natural infections known are in Virginia in Patrick and Henry Counties, which border on North Carolina. Undoubtedly the disease extends considerably further south and west; as only a brief inspection was made, the limit of extent was not determined.

The zone which is heavily infected with the bark disease, has been spreading southward from New York at an average rate of over twenty miles per year. The disease has been spreading westward across the mountain ridges somewhat more slowly. In the spread of this disease in the past, infected nursery trees were quite a factor, being much more important than they will be in the future. However individual cankers enlarge at a much faster rate in the south than in the north. There has been hope that the progress of the disease would be retarded by the higher per cent of tannin in the bark and

wood of the chestnut of the south or by some other factor. No indications of any decrease in the virulence of the disease have been noted so far and the expectation is that the chestnut growth of the Southern Appalachians will be killed off just as the growth from New York south to southern Virginia is being killed.

In the Southern Appalachians it is expected that the loss to private owners through deterioration of killed chestnut timber before it can be marketed will amount to a very large sum. Local markets become glutted and local sawmill men become swamped with work as the practically impossible task of cutting over the entire forest area of a large region must be accomplished within a comparatively few years in order to prevent serious deterioration. Dead timber is more difficult to cut and saw than live timber, in addition to the greater breakage in felling and the difficulty in selling. Chestnut of pole and timber size can, of course, be utilized for tannin acid extract wood after deterioration makes it unfit for other purposes. Owners of tannin extract chestnut who do not cut their trees within a few years after they are killed should figure on a decrease in volume of wood due chiefly to fungus decay. It is a pity that so many of the individual owners of woodland do not consider their forest growth as a crop, as a business to which attention must be given if profits are to be secured. Already in northern Virginia thousands of acres of chestnut growth need to be cut quickly if deterioration is to be forestalled, especially in the case of trees suitable for poles. Many owners make no effort to market their dying chestnut, not realizing that it is decreasing in value. In many cases where chestnut does not constitute a large per cent of the stand, it suits the owners better to allow the chestnut to deteriorate while waiting for the time when the entire stand can be cut over, or waiting for other reasons.

It is important though for owners to realize present conditions in regard to their chestnut growth and make their plans accordingly.

On a brief inspection trip in North Carolina in July, 1920, advance infections of the chestnut blight were found in the following counties: Stokes, Surry, Yadkin,

Wilkes, Ashe, Watauga, and Avery. The disease is rapidly spreading southward along the Blue Ridge Mountains. An infection in Linville Gap, North Carolina, is at an altitude of 4,000 feet. The blight is probably now present in Tennessee, as it has been found in three counties in North Carolina, which border on Tennessee.

SENATOR HARDING ON FORESTRY

EXTRACT FROM ADDRESS TO EDITORS BY SENATOR HARDING, REPUBLICAN NOMINEE FOR PRESIDENT, AT MARION, OHIO, AUGUST 13, 1920:

"PERMANENT and ample relief must come by going to the underlying causes. No forest consumption like ours can go on indefinitely without imperilling our pulpwood supply. Competent authority tells us that the pulpwood in New York State will be exhausted in ten years; that New England will be denuded of its supply in twenty years. Our needs are so vast that we imported nearly one and a half million tons of pulpwood from Canada in 1918, and the Canadian price advanced from ten to twenty-five dollars per cord. It is obvious that we must have a forest policy which shall make us self-reliant once more. We ought to be looking ahead to produce our timber for our pulpwood needs and also our timber for our lumber needs. Forest conservation is a necessary accomplishment to printing expansion, and a matter of common concern to all the people.

"Three-fifths of the original timber in this country is gone, and there are eighty million idle acres in which we ought to be growing forests for the future. Planning for the future, with added protection of our present forests from fire is a matter of deep concern to publishers in particular, but all of constructive America as well."

Extract from Senator Harding's speech to lumbermen at Marion, Ohio, August 18:

"The realization of our highest hopes lies in the continental construction and improved character of our homes," Senator Harding continued, "because they have the first influence in the standard of American living. Quite apart from furnishings and the almost limitless numbers of varied utilities, lumber is the first requirement of the prospective home builder.

"At the present time there is a notable halting in the construction of homes because of the almost prohibitive

cost. Lumber plays its very conspicuous part therein. Much of this, of course, relates to the increased cost of production, which dates from the changed conditions since our entrance into the World War, but there is a permanent inclination to advance the cost because of the very manifest diminution of supply.

"We ought to have a national policy of preservation and reforestation. No one disputes that lumber prices are in large part responsible for the halting in the housing building movement. Lumber prices have increased very sharply since the war and prices in many instances have gone up 300 per cent above those of the pre-war period.

"The one thing which the government may do is to adopt that policy which will assure to future generations the timber which is necessary to our lumber needs. There remains a large supply on the Pacific Coast, but the problem of transportation makes this supply unavailable to the East and Middle West, unless we contemplate a cost of transportation which will continue to discourage building enterprise.

"It is a common knowledge that there is ample land in this country of ours, not adapted to other uses, to produce a sufficient supply of timber for all our needs if it is only stocked with trees and nature is allowed to contribute toward our necessities. We must begin to think of timber crops as we do other cultivation in this land of ours, and we must put an end to that carelessness and neglect to which we trace our destructive forest fires.

"With timber growing on the one hand, and forest preservation and protection on the other hand, there isn't any reason why the United States should not be self-reliant in the great essential of lumber for construction purposes."

AUTUMNAL WOODS

When summer voices cease amidst the trees
And all is hushed except a whisp'ring breeze,
The Woods of Autumn don, anear and far,
A gorgeous raiment and regalia.

In silent splendor, 'neath unclouded skies,
Each woodland like a vivid painting lies
Resplendent in the sun, each hillside seems
Like visions we behold in realm of dreams.

In russet and in gold! Half-fresh, half-sear,
Fall's foliage is shining far and near,
Yet here and there some pine trees, ever green,
Subdue the splendor of a sylvan scene.

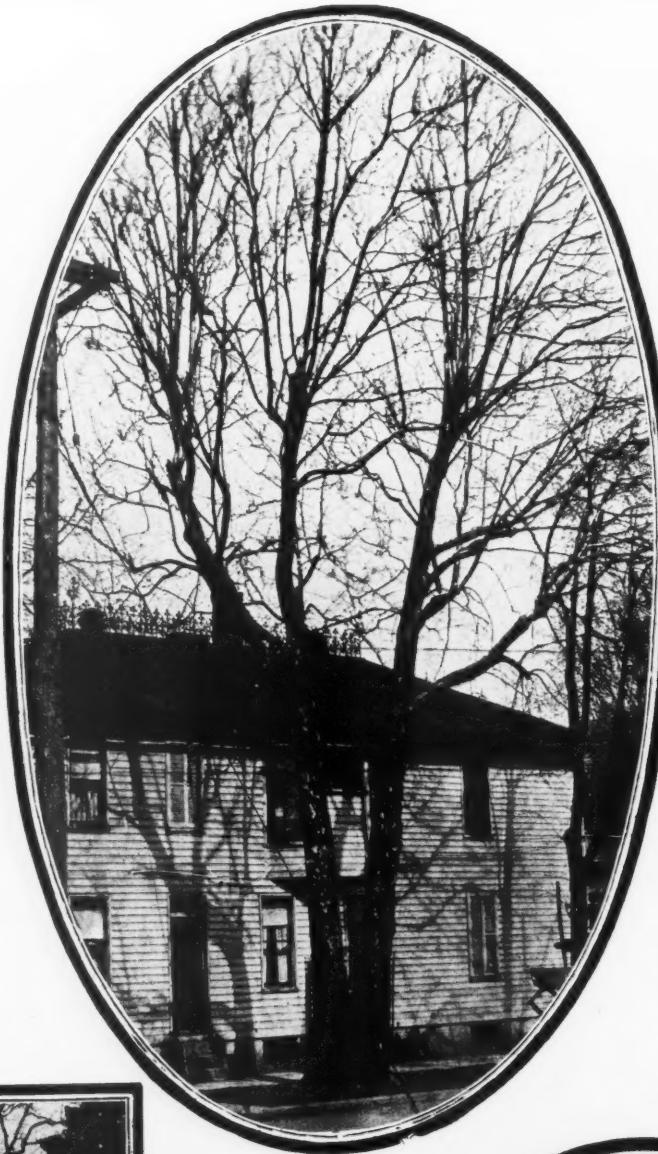
Autumnal Woods! Which fade ere Frost's fine pen
Draws frozen frets on window-panes again.

—Charles Nevers Holmes.

"HALL OF FAME" FOR TREES

This sycamore, which was only a sapling during the War of 1812, has been nominated for a place in the Hall of Fame by Mrs. John Locke, of Tiffin, Ohio. The sapling stood just inside Fort Ball and it has been marked by the Dolly Todd Madison Chapter of the Daughters of the

American Revolution. Mrs. C. H. Van Tine's home now stands beside the tree. Just opposite the sycamore is the site of the home of General W. H. Gibson, widely known as a soldier and orator. Quite near is the monument erected to the soldiers and sailors of the War of 1812 and the Civil War.



This tree at Marshall, Michigan, has been nominated for a place in the Hall of Fame for trees because it saw the birth of the school system of the State of Michigan. The nomination is made by Mrs. James Metcalf Redfield, of La Jolla, California.



Marking a treaty of peace with Indians long ago this tree has been nominated for a place in the Hall of Fame by C. A. Ingraham, of Cambridge, New York. It is the Witenagemot Oak, in the town of Schaghticoke, Rensselaer County, New York.



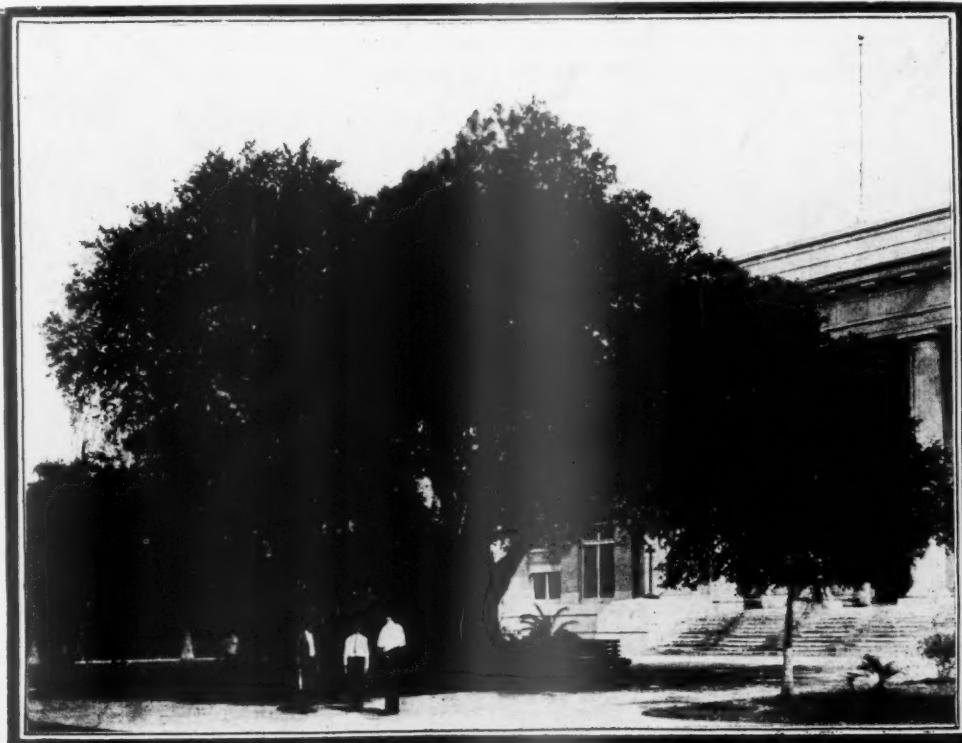
"HALL OF FAME" FOR TREES

Because a tract of forty acres was set aside by A. E. Wilse, a mining man of New York City, that this tree might be saved, it has been nominated for a place in the Hall of Fame of the American Forestry Association by J. R. Prince, of Tuolumne, California.



The first flag ever thrown to the breeze in the South, on which was printed "Immediate Separate State Action" was girded to this Red Oak, writes W. D. Craig, of Chesterfield, South Carolina, in nominating this tree for a place in the Hall of Fame of the American Forestry Association. The flag stayed there, Mr. Craig adds, until General Sherman burned the court house and the jail.

The Women's Club of Fort Myers, Florida, of which Mrs. Thomas A. Edison is a member, saved this tree when there was talk of cutting it down at the time the court house was built. The tree is nominated for a place in the Hall of Fame by Mrs. Carolyn A. Brandon. (Photograph by Hunt.)



FAMOUS TREES

FROM Mrs. Elizabeth Stephenson Bentley, of the Calhoun County Historical Society, comes the information about and a picture of the sycamore which was a baby during the War of 1812. (See page 608.) Under this tree some time in 1831 or 1832, General Isaac E. Crary and Rev. John D. Pierce planned and worked out the present school system of the state: It was on a Sunday afternoon the men sat beneath the tree on a hill near the Calhoun County Court House. This hill is now occupied by the home of C. E. Gorham and the tree stands near the house. It has a spread of sixty feet and is in a good state of preservation. Crary afterward became the first Congressman from Michigan and Pierce the first superintendent of public instruction.

The Witenagemot (meaning assemblage of the wise) Oak (page 608), was planted in the spring of 1676 by Governor Andros as an emblem of peace between the Colonial government and several neighboring tribes of Indians, the Schaghticokes, among the rest. One thousand warriors were present at the ceremonies and many prominent representatives of the Colonial government added to the impressiveness of the occasion. This venerable oak stands a short distance in the rear of the old Knickerbacker mansion, on the south bank of the Hoosac River at the place where it is joined by the Tomhannac Creek, and the flats which prevail here were called "The Vale of Peace," or Schaghticoke Meadows. Washington Irving was entertained in the Knickerbacker mansion at different times, and it was here that he obtained his idea of the character, Diedrich Knickerbacker, which figures in his "History of New York."

A fine lesson is taught in such an act as that of A. E. Wiltse when a tract can be set aside for one oak tree in a State like California, famous for trees. (See page 609.) Some claim this tree rivals the famous Sir Joseph Hooker Oak at Chico, California, which was pictured in AMERICAN FORESTRY some time ago. The circumference of

this oak is 31 feet and the spread of its branches is 130 feet while the age is estimated at between six and seven hundred years.

The Red Oak at Chesterfield is one of the most historic trees in the State of South Carolina (see page 609), and takes its place beside the famous Bluffton Oak underwhich the "Bluffton Movement" was born, which had a direct bearing on the Civil War. Of the oak at Chesterfield, Mr. Craig says he can see no difference in the tree now and the way it looked in 1852. He continues:

"My father's house was just across the street from this tree and the open court around it—a well of good water almost under its long limbs. The weary traveler could hardly resist the refreshing shade of this old tree and I have many pleasant and sad memories connected with it besides many handed down by tradition. The last tribe of Indians in this county, for whom the stream just under the hill was named, found this a place after their own hearts after trading their pelts for a jug of grog. For a long time you could find around this spot evidence of their stay such as arrowheads, pipes, etc. The slaves found this a favorite place to spend their Sunday evenings; when passing the oak I can yet hear their carefree songs and laughter. And oh! the frolics and fights I have witnessed under this old oak—in antebellum times we had "rooster day" every three months; there were always barrels of home-made cider for sale

WAR MEMORIALS

A tree, a stone,
A church, a bridge,
A star, a cross
And flags—
O valiant ones
Who seek today
Adventure still and far—
What is there now
More fitting than a tree—
A strong young tree—
To keep your memory green?
A tree that sings
Of home and youth,
Of love
And loyalty;
A tree that has its roots
In cherished soil,
A tree whose branches
Wrestle with the storms;
A tree that makes an altar
For the sun, and knows, dear lads,
Even as you must know,
The thrill of life,
The urge of growth
And struggle,
The peace of jeweled night—
And the wonder of awakening
To find the Morning Star.

—Abigail F. Taylor.

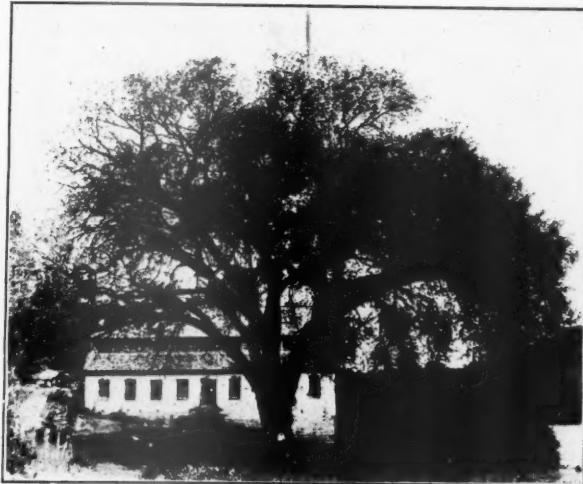
on this spot, and such cider is not known in these days—it had the sparkle of champagne and the kick of esquallagh. It first cheered the men up to all kinds of fun for the drill, then settled into the opposite direction and made them fight. If there were no old grudge to be settled, some bully would make a mark across this court and dare any one to cross the line; some other bully would soon accept the challenge and at it they would go. No weapons were used in these fights, so there was rarely ever any serious injury inflicted."

A VETERAN GIANT OF ELMS

BY R. S. MADDOX

NEW ENGLAND is noted for her elms, and well she may boast of their magnificence. But thanks to the bountifulness of nature there is no particular monopoly on elm tree growth.

At Kingsport, Sullivan County, Tennessee, on the holdings of the Kingsport Farms, Inc., of which Mr. J. Fred Johnson is president, are some of the most magnificent elms in the country. Some were set out probably one hundred years ago on residence sites and others are growing where they happened to start. One of these elms is shown in the accompanying picture. It is near the water's edge of the north fork of the Holston River near Kingsport, Tennessee. Decades ago, in 1790, I believe, a company of Frenchmen traveling through this section of the State camped at different places, making a record of their trip and



THE BEAUTIFUL KINGSPORT ELM

Not only a magnificent specimen but one with a most artistic setting—beside the old brick silk mill on the Holston River.

noting objects of particular interest. In writing of some of his observations after returning to France, one of the men mentioned particularly a wonderful elm and spring, the spring flowing from the roots of the elm, which description fits this magnificent old tree. He also is said to have given the measurement of this elm as 22 feet in circumference. The circumference of the spreading elm tree here shown is 25½ feet today, taking the

measurement a foot from the ground on the uphill side. The elm and spring described by the Frenchman are in all likelihood the same as that on the farm of 2,300 acres now owned by the Kingsport Farms, Inc. The tree has a very symmetrically shaped crown and pendant lower limbs, with a spread which some have estimated at about 150 feet. If in 1790 this tree was 22 feet in circumference and is now 25½ as above stated, the probability is that it is more than four hundred years old.

This magnificent old tree through a misfortune of its own brought itself into prominence recently. During the summer its foliage was attacked by red spider and a fungus which defoliated it severely. During August a second crop of leaves began to put out and they are reported to have been attacked in the same way. Every effort has



COMPARISONS ENLIGHTEN

This near view of the great elm gives a very comprehensive idea of its massive proportions.

been made to get the tree sprayed but without success to date, and although late in the season it will be sprayed if it can be done within reason. Incidentally, an interesting feature of the landscape connected with the old elm is the building shown in the background. This old brick structure shows the remains of one of the first, if not the first, silk mill that was put up in Tennessee, if not in the entire South. Its builder and operator was Frederick K. Ross, who came originally from Virginia.

CHANGE OF ADDRESS

It is urgently requested that all changes of address, whether temporary or permanent, be sent in promptly.

Both the old and new address must always be given.

Such co-operation will be helpful in avoiding the loss of magazines.

WHAT SHOULD BE OUR NATIONAL FOREST POLICY

BY LT.-COL. W. B. GREELEY, CHIEF FORESTER, U. S. FOREST SERVICE

I THINK we have had enough discussion of general principles of what a National Forest policy should be. I think that whatever disagreement we may personally feel in regard to particular figures, as to particular states or regions, we are all convinced of the fundamental fact that something definite and tangible must be done to restore the timber supply of the United States. I think we all recognize that the big objective of this effort must be to get growth on forest land that is not in demand for other uses than the production of timber. Starting from that basis, it seems to me that our forestry program in the first place must fit our existing forms of government; it must fit our existing and habitual ways of doing things; it must fit the recognized fields of jurisdiction of the different public agencies who should participate and of the private individual. We cannot nationalize all of the forest land in the country. At the same time, the public has a very large and important place in any program of reforestation; the public has, I think, very definite responsibilities. There are certain things that the public only can do. It is impossible to bring the forest fire hazard under control without public action, because you can never control forest fires without a vigorous exercise of the police powers lodged in the public.

At the same time, as I see it, there is a very definite, necessary place in this program for the private forest owner and the private forest industry. I do not want to see individual initiative eliminated. I want to see the enlightened timber interest of the lumber owner and the manufacturers of forest products given just as large a part in this forestry program as possible. I think at the same time that the forest owner must recognize that he has a responsibility as well as the public; that in the long run the forestry movement will increase the value of his land; that in the long run he has a responsibility not only not to permit the condition of his property to be a menace to his neighbors but not to permit the condition of his property to be a menace to the industrial welfare of his country.

In recognizing any such responsibility as that we must immediately couple with it the principle that what is required of the private owner must be equitable and fair in consideration of the conditions under which he is operating.

Taking these three angles then, the federal angle, the State angle, the private angle—it is my conception that a forestry program which will be effectual, which will accomplish results, must be built up on the principle of co-operation in which all three of these elements participate. That leads at once to one of the important points, more or less fundamental, as to what the relations should be between the Federal Government and the States. Very strong arguments have been advanced in favor of outright, positive federal control of the handling of forest lands.

Many of those arguments in principle cannot be answered and I do not take issue with them. The question as it appeals to me is the practical road, the tangible accomplishment. It does not seem to me wise to adopt a theory in attacking this great problem that is going to lead us through 10 or 15 years of controversy, of litigation over the constitutionality of enterprises arising from conflicting jurisdiction between the Federal Government and the States.

I feel that we will get results measured in actual terms of timber growth—and that is the only way that you can measure results—much more rapidly if we at least begin on a basis of co-operation that undertakes to give a fair recognition to the existing ways of doing things, to the American idea of handling locally the things which concern you locally. It is my feeling that the function of the Federal Government should be a co-operative one—that as far as possible it should deal through the State; that it should seek to correlate action between the states as far as it can in a co-operative spirit; it should set the pace; it should give the several states real leadership; it should give liberal financial assistance.

I think as a necessary correlative of this principle—the Federal Government working with the State through the State organizations—we must recognize the right of the Federal Government to insist as a condition of its co-operation, where it deems necessary, that certain standard requirements be met by the states. That is the only way in which you can make federal leadership and correlation between the states effective. As it becomes clear in dealing with this or that set of conditions that certain standard requirements must be met, those requirements must be made a prerequisite of federal co-operation.

Now, beginning with those general ideas, our legislative program in forestry, as I see it, must aim at five big things.

The first of these is to bring the forest fire under control. That represents 75 or 80 per cent of the whole problem. I would, if necessary, say for the next 10 to 20 years, forget everything else and concentrate all our energies upon that one thing of bringing our forest fire losses down to a basis where they can be figured on more or less as a fixed hazard or a fixed liability. That must include all classes of forest land. It must include the cut over land, the land that has been denuded by forest fires, the land once in timber but now cut and unimproved and now being made no use of; it must include in my conception, every class of forest land unless that land is economically in demand for some other use. I think that we must do a great deal along the line of studying the use of land, the practical classification of land to determine the types of land which in the long run we anticipate will be devoted to farm crops rather than timber growth, but the actual test which I would apply—and I would apply it as a matter of law—

is that we would regard any particular tract of land as forest land, to be protected as such, until that land is actually converted to other uses. In other words, a classification of land by actual use rather than by soil examination.

Our forest protection plan must include the disposal of slash. I have become convinced that there is no half-way measure; that we have got to make as a definite plank in our forestry program the practical fireproofing of our woods as far as we can within reasonable cost limits. The disposal of slash must, the country over, be recognized as a part of the logging operations. These things I would accomplish under the police powers of the State, applying the principle I stated a few moments ago, the Federal Government working as a co-operator of the State, and looking to the State to carry these requirements out with the private owners.

I said that forest fire control in my judgment would accomplish 75 or 80 per cent, possibly more, of the task of getting our lands back in timber growth, but there will be cases, there will be regions, where we must go beyond that, and as those cases and regions become clear, and as we know with certainty what should be done in addition to keeping out the forest fires, we should have the legal authority to make those essential things a requirement on the timber owner. Again, that principle must be coupled with a correlative that such requirements must be fair and equitable in consideration of the actual co-operating conditions; that they must be framed and enforced by local authority in which the interests who are affected can be locally represented and which will have the maximum opportunity to know the local conditions with which they are dealing.

In connection with these two planks—the first two commandments, as I see it, in our forestry program—the control of fire and the following of fire control with such other measures enforced by local authority as may be necessary actually to prevent the denudation of forest lands, I believe we should undertake to largely extend the existing public forests, for we have many areas of cut-over land which will come back into timber very slowly, perhaps not at all, unless planting is resorted to. I think that it is up to the Federal Government and the states to shoulder a considerable part of that work. I think that the Federal Government and the states in the forested regions should both embark on a policy of the acquisition of public forests.

The next point which I think everyone who has considered this question recognizes is a mighty important one is that of forest taxation. It is too big a subject to spend any time on here. It seems to me that the best way to tackle that problem is for each state whose forest resources are important, to work for the designation of a legislative commission which would be instructed to make a thorough study of the subject of existing methods of taxing forest lands upon the denudation of such lands and to report suitable legislation. The Federal Government might, if it were enabled to by Congress, co-operate with these states in making such a study of taxation.

Lastly, our forestry program should provide for getting much more accurate information on many of the questions that are involved. We need a much more accurate census or inventory of our timber resources, not only our standing stumpage, but our timber growing resources, than we have ever had. We need with that much better information than we have ever had on what our national requirements for timber are, region by region—what the requirements of our principal industries are, region by region. We need to get those two sets of figures to see how far we can fit them together, seeing how much land the country ought to have perpetually in timber.

These are the five main points which it seems to me our forestry program should aim at. There are, of course, others, but I have sheared them down to what seems to me to be the five essentials. How should we go at it?

In the first place, we should have, sooner or later, sooner if possible, a comprehensive federal forestry law. Its first plank should be an appropriation, which I have put at not less than a million dollars, to enable the Forest Service to co-operate with the states in forest fire prevention, in working out the methods of handling various classes of timber land, in addition to fire prevention, which are necessary actually to keep them in timber growth, and in other phases of forestry.

The expenditure of this million dollars would be regulated on the same basis as the expenditures under the Agricultural Extension Act and under the Federal Aid Road Acts,—that is, that the states must put up at least dollar for dollar with the Federal Government. The expenditures under that act should be further limited to states which meet what the Federal Government regards as essential minimum requirements in fire protection and methods of cutting; but I want to say right here that if such an act as that were passed and I were responsible for administering it, I would say to the states that the thing we want to get across first is fire protection.

The second plank should be one for extension of the federal forests by purchase and by consolidation through exchanges.

The third plank should be one that will enable the Federal Government to assist the states in working out this question of forest taxation.

The fourth plank should be a provision for a general survey of forest resources that I spoke of, and in that I would include, where it is necessary, co-operative studies with the state in regard to classes of land that should be devoted to forest purposes.

So much for federal legislation. Now, concurrently with that we need state laws which will carry out the state end of this game, because the plan that I have outlined is not going to be effective unless we get the states in it.

My idea as to state legislation is that you don't want to attempt too much in your law; that you have got to put your confidence in a commission, or a board, or some

(Continued on page 617)

LIVING STUMPS OF TREES

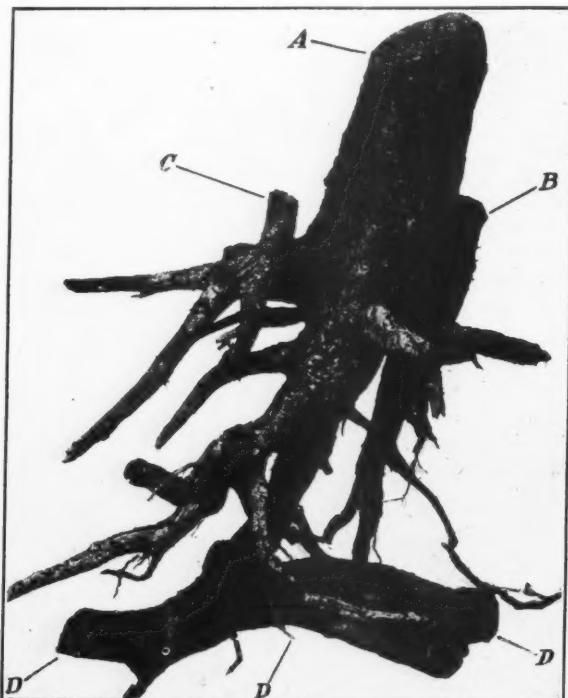
BY C. C. PEMBERTON

WHEN a tree is cut down it ordinarily dies or sends up sprouts from the stump or roots. Only a few conifers can sprout from the stump. In others the stumps usually die. In some species, however, instances are found of stumps which do not sprout but, nevertheless, do not die. On the contrary they retain their vitality to a surprising extent and apparently with-

however, expressed doubts on the subject, saying that it was "as likely for a pump to draw water without a piston as for a tree devoid of leaves and branches to continue to produce annual layers of woody matter." Grigor, nevertheless, had been able to prove by "ocular demonstration," the truth of his assertion, although no decision was reached as to the cause.

Professor Somerville, of Cambridge University, England, has lately expressed the opinion that though the phenomenon is usually attributed to the natural grafting of roots of the stump with those of adjoining trees left growing, the subject has not been sufficiently investigated. He distinctly states that, in larch, a certain amount of growth can take place in a *stem* that has been served, and that if such a stem is laid in a cool moist place, the cambium becomes active in the spring and a ten per cent annual ring can be formed in the ensuing season.

The matter seems to have received consideration also in Germany. In the Kew Bulletin (1917, Nos. 9 and 10,



DOUGLAS FIR

An example of remote and indirect root graft and consequent healing of stumps. A and B are healed stumps whose tap roots have grafted with the underlying roots of a large, foliage possessing fir tree fifty feet distant. D.D.D. are the roots of the large tree spreading laterally at a depth of two feet below the surface. C is another small fir stump healed over, having only indirect union of roots.

out the aid of foliage. There has been much controversy as to the cause of this remarkable state of affairs. Some aver that union of roots of the stumps with those of adjacent standing trees accounts for the phenomenon. Others contend that it is due solely to the reserve material in the stump, and in support of their contention point to instances of stumps apparently isolated and remote from other trees which nevertheless can make bulky formations of new annual rings.

According to a letter recently appearing in the *Victoria Daily Colonist*, Victoria, British Columbia, from Mr. A. D. Webster, Inner Circle, Regents Park, London, England, the healing over of these stumps had attracted attention in England early in 1800, and Grigor, an English botanist who died in 1848, had described them in his "Agriculture." French reviewers of the book,



DOUGLAS FIR

This is an example of a natural root graft between two Douglas fir trees. To the left is portion of the trunk of the tree which retained its foliage and to the right the stump. The center of the stump is decayed, but the rim of live wood around the outer edge is plainly to be seen.

p. 303), Mr. W. Dallimore, in his instructive article, "Natural grafting of branches and roots," referring to these stumps, quotes Sorauer, *Handbuch der Pflanzenkrankheiten*, Berlin, 3rd ed., 1919, vol. I, p. 774, to the effect that while root union may often be the solution of the enigma, there are stumps too remote for such a possibility which nevertheless show bulky over-growth. In the latter case, he thinks reserve material is responsi-

ble for the commencement of the overgrowth, but that it is subsequently stimulated by the chlorophyll present in the cortex of the callus.

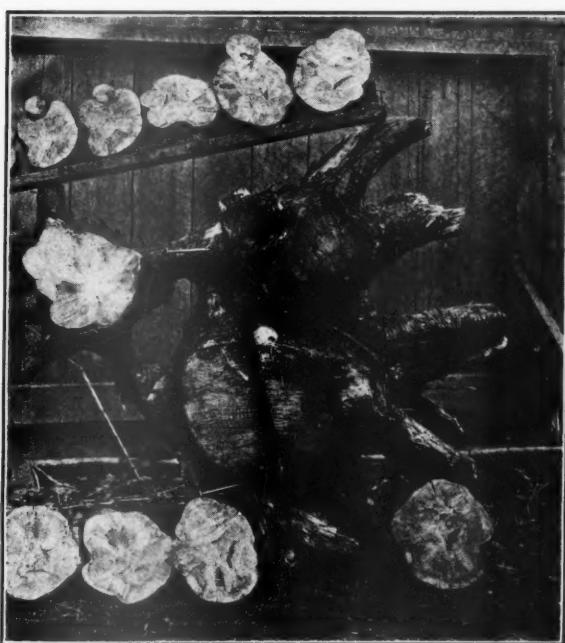
Professor Jepson, a California authority, referring in "Trees of California" (1909, p. 33, Fig. 29) to the presence of these stumps in California, expresses the opinion that the phenomenon is undoubtedly due to natural grafting of roots. Professor H. S. Newins, of the Oregon Agricultural College, in the Proceedings of the Society of American Foresters for



DOUGLAS FIR

Remarkable manner in which stumps of the Douglas fir tree heal over when their roots are grafted to standing trees in the vicinity. After this cap was removed a renewed healing took place, as seen in the small piece in the center of this photograph. Another healing is now occurring in the cap from which the small piece was cut.

a number of scattered Douglas fir trees of large size and well branched through growth in the open. About fifty feet away from one of the largest stood a group of nine small Douglas fir stumps completely capped over. No indication of root graft between the stumps and the big tree was to be seen. Chinese felling timber in the vicinity for firewood cut down the big tree, and as soon as they did so the vitality in the stumps ceased. I employed the Chinese to dig up the intervening ground between the tree and stumps and then the fact was disclosed that the spreading roots of the big tree, at a depth of two feet below the surface of the ground and at a distance from the tree of fifty feet, had formed a union with the tap roots of one or two of the group of stumps. These stumps, so united with the underlying root from the big tree, were in turn root grafted with the others



SCRUB PINE

This shows how the three trees are welded together in a natural graft of the roots and base of stems. Union of roots does not in this species (*Pinus contorta*) enable a tree possessing foliage to keep the stumps of another alive by means of root graft.

October, 1916, cites a number of cases in which he proved by actual excavation that living stumps which were apparently isolated were as a matter of fact connected by natural root grafts with standing trees.

I have made a number of such excavations and have never been able to find an instance in which uncovering all the roots did not disclose root unions, direct or indirect. One example of the latter was particularly noteworthy. On Langford Plains, near Victoria, there were



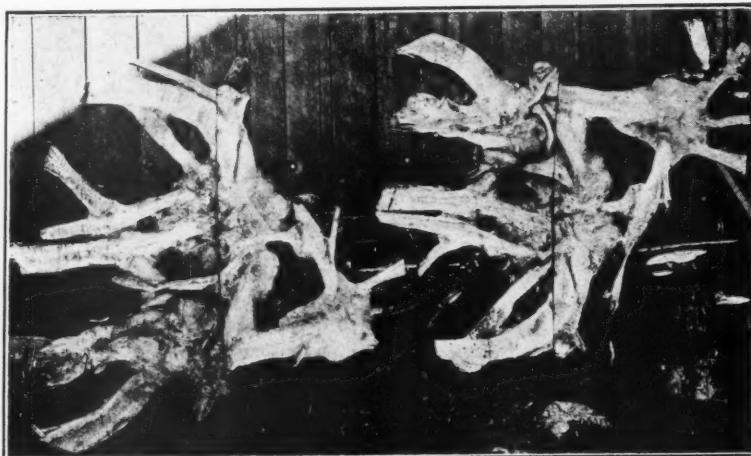
GRAND FIR

In the foreground are seen the living roots of a stump which has decayed away. The trunk of the big tree from which the live roots obtain their vitality through root graft is seen at the back of the photograph. These are Grand fir (*Abies grandis*).

of the group further away. It was, therefore, apparent that the wood forming material from the foliage of the big tree was transmitted by means of the root graft directly to some of the stumps, that they passed it on to

others more remote, and that as soon as the foliage possessing tree was killed the source of the vitality of the stumps was gone and they too died.

This power to pass on by a series of successive and indirect root grafts, the vitality and wood forming material from the growing tree is in my belief the solution of the problem of how very remote stumps are able to show healthy overgrowth; especially as there are cases in which the major part of the stumps decay and the roots only remain alive. Not all species possess this power; and those which do not are unable to support living stumps no matter how closely the roots of the stumps may be intermingled with those of adjacent standing trees. The practical value of the characteristic still lies within the realm of speculation. Is it possible that some day we shall make use of it for the produc-



"SCRUB PINE"

The only scrub pine Mr. Pemberton could have worked on in B. C. is the coast form of the Lodgepole Pine, which is locally called "scrub pine." This section of the three trees shows how completely they are joined together by natural grafting. Most pines do not appear to possess the power to heal stumps by root graft.

this. At the first Camp in France of No. 34 Company, Canadian Forestry Corps, intergrafting of the roots of the pine trees was found to be of frequent occurrence. In one instance three trees were very closely united. The bases of the stems and the roots of the three trees were all welded together. One tree had been cut down some time previously, and though its stump was charged with resin there was absolutely no sign of vitality.

THE OLD TREE IN THE CITY SQUARE

BY GARNETT LAIDLAW ESKEW

The ringing clank of the axes
Sounds through the spring time day;
The saw eats into the tree trunk;
The old trees totter and sway.
There is a moment of rending
Like the breaking of old home ties,
Then a thudding sound on the soft wet ground—
Another old resident dies.

Time was when the old tree blossomed
And made through the summer's heat
For the old time folk on the benches,
A leafy and cool retreat;
When each year broadened and added
To the mighty expanse of bough—
But the gaunt arms there up above the square
Are barren and colorless now.

And I wonder, when *my* fight is over
And I have lain wearily down,
Will someone step for a moment
From the rush of the noisy town
And count all my life time over,
And say, "Loads are lighter a bit,
And the world goes by more happily
Because *he* has lived in it?"

Time was when the mad throngs passing
Along through the city's glare
Saw the huge old tree, and remembered
That God had his temple there—
Remembered the hills and the moorlands
All dressing in green again—
And who shall deny that they all passed by
Better and worthier men?

Today I paused in my passing
And looked where the old tree lay—
A mighty and fallen warrior
Hewn through at the end of the fray.
And I counted them slowly over—
The rings that have marked each year—
Oh our sires were young when that tree first sprung!
And now, it lies quietly here.

tion of living fence posts or telegraph poles?

While in some species such unique consequences follow the joining together of roots, which takes place so readily in conifers, in other species it is quite different and they do not possess the power of transmitting vitality even when roots are directly joined together. I have seen an instance proving

(Continued from page 613)

form of state authority dealing with forest questions that will have authority behind it in the laws of the state to determine what is necessary within reasonable limitations; to apply these regulations and requirements to the private owners of the state subject to some provision for appeal, or review in cases where an individual private owner feels that the state commission has been arbitrary or has exceeded its authority.

I would authorize that state commission, in the first place, to establish a sufficient fire protection organization to control the fire situation of the state; with a sufficient appropriation to carry that out, but with the provision that every private owner who benefits from that protection must contribute a fair and proper share to its cost. I would authorize the commission to levy the cost of fire protection upon the lands of private owners who will not contribute voluntarily—to make that a lien upon the property; but I would put, probably in the law itself, some limit as to cost per acre, some equitable limit, beyond which your commission cannot go.

I would authorize that commission to deal with the question of slash disposal in the same way, giving them authority to prescribe the methods of slash disposal applicable and practical under this and that set of conditions. Don't limit them in the law to details, limit them as to a total cost; put the protection to your timber owner in that form. Third, I would give the commission authority, subject to appeal, to determine what other method should be employed in the way of restrictions in cutting timber in order actually to prevent the devastation of the forest lands of the state. I would make that commission non-partisan in character. I would provide definitely for the representation of other interests in the state upon it, in accordance with whatever the best arrangements may be in each state, to get a representative non-partisan commission that will hold the confidence of the public and the state. That is the first and biggest feature, in my judgment, of any effective state forestry law.

Now I would follow that, in outlining a complete or ideal state program, with some provision in each state, even on a small scale, if necessary, for building up state forests. Personally, I cannot agree with the proposition expressed by Governor Philipp here yesterday, that the duty of growing timber is entirely a duty of the national government. It is a duty of the national government and they should go at it, but it seems to me that it is a responsibility that the states also share. It seems to me that Wisconsin, Minnesota, and Michigan have an obligation to their own citizens, to their own welfare, their own future taxable property, and future industry to take an active hand in this proposition of growing timber. I am for state forests as well as federal forests.

The third point is the question of taxes, upon which the only suggestion I can make is one of investigation and publicity through the designation of a legislative commission. There are a good many other things that

would be desirable in this or that particular state. I have not touched on state nurseries and I think that it is important in some prairie states to go into that phase. The things which I have mentioned are the essential things.

There is only one way to get this program accomplished, and that is by all taking hold of it; by creating a public demand for this kind of legislation that Congress in Washington will have to recognize, and that your state legislatures in the various states will have to recognize. I want to see the men and business interests who are most directly interested in this take the leadership in this fundamental public task. The American Pulp and Paper Association has already formulated and approved definite forestry proposals, many of which are quite in line with what I have outlined. The National Lumber Manufacturers' Association, through a Forestry Committee, which recently held a meeting in Chicago, has also formulated a set of principles and certain proposals for federal legislation which represent, by and large, an advanced position, a creditable position, for that industry to take.

It seems to me that all that we can add to the consideration of these questions, all the support and impetus we can put behind this proposition, means that we will get a definite somewhere that much sooner. I would like very much to see the interests represented here take some action which will enable them collectively to give the proper consideration to these proposals and to other proposals, and to be prepared when the proper time comes to make their voice and their influence felt.

(Extracts from an extemporaneous address delivered at the reforestation conference of the wood-using industries held at Madison, Wisconsin, July 23, 1920. This is the clearest presentation of the Forest Service program that has yet been presented.)

NEW METHOD OF TAGGING TREES

LINEN cloth is now being used in some of the experimental work of the United States Department of Agriculture in tagging trees and has been found to be very successful. Writing on wooden tags, which were formerly used, soon becomes illegible, while copper tags are not only expensive but are not large enough for sufficient data. The linen tags are first soaked several days in water to remove the sizings and then dried and smoothed with a hot flat iron. Data is written with India ink using a round-pointed pen. The ink soaks in but does not run. Such tags will last a year or longer. When they are to be used for longer periods or under conditions where the tags come in contact with the ground, they are coated with paraffin after labeling. One method is to dip them in a mixture of gasoline and paraffin (proportion 1 quart of gasoline and one-half pound paraffin). The gasoline evaporates leaving a film of paraffin. If the tags become coated with mud they can easily be washed and the ink shows up clearly. Such tags may be used in a variety of ways, for when treated in this manner they last exceptionally well.

NUT TREES IN LANDSCAPE WORK

BY O. C. SIMONDS, LANDSCAPE GARDENER

ALL trees are beautiful and should serve in some place in landscape work. Some are more beautiful than others and where but few trees can be used the more beautiful would naturally be chosen. Much attention is now being given to the planting of nut trees on home grounds, highways, parks, city streets, boulevards, country roads and elsewhere.

Not long ago a lawyer was talking to me about the beauty of black walnuts. To his mind there was no tree more beautiful, and, from what he said, he would use it almost to the exclusion of other trees. My own judgment does not fully coincide with his, although I consider a black walnut a very attractive tree. It grows to a large size and is generally healthy.

Its shape is good and its foliage attractive in summer. The leaves usually drop early and they are not especially attractive in autumn coloring. Black walnuts are strong in appearance. They

the black walnut would come about in the center of the list for most locations. The list itself would vary for different situations and climates. I should advise using black walnuts plentifully along the highways, especially country roads, and somewhat sparingly in home grounds and the other locations which I have named. By plentifully I do not mean to the exclusion of other trees, for, in most places, there should be more elms and maples than black walnuts, but highways are so extensive that many kinds of trees could be used in abundance to give shade. In woods there might be places where black walnuts could be used in profusion.

The objections that one might raise to the use of black walnuts would be, first, the comparatively short season of the leaves. These come out rather late in the spring and drop early. Probably these trees can not be improved very much in this respect. Second. Boys



THE EXQUISITE BEAUTY OF AN ALMOND ORCHARD IN FULL BLOOM



A BEAUTIFUL AND EFFECTIVE PLANTING OF ENGLISH WALNUTS ON A BROAD AVENUE

lack the gracefulness of the elm and if I were making a list of trees in the order of their appearance, placing the most beautiful first and the least attractive last, I should place several trees ahead of the black walnut, among them sugar maples, elms and several of the oaks. Perhaps

will sometimes throw sticks at the trees to bring down the nuts. If a boy comes in home grounds to do this he will be considered a nuisance. Branches are sometimes broken and trees disfigured from this cause. Along highways this objection might perhaps be lessened somewhat by



THE DISTINCTIVE BLOSSOM OF THE HORSE CHESTNUT

planting enough trees so that there would be more nuts than the boy would want, or by improving the manners of the boy. Third. The trees are often attacked by great numbers of caterpillars. This objection can usually be obviated by spraying or destroying the pests in other ways.

What has been said about the black walnut would apply in many ways to the butternut, its nearest relative. Butternuts have a range extending farther north and they are more subject to disease than the black walnuts. Like the walnut, their leaves come out late and drop early. They are subject to the attacks of boys. When healthy they are attractive in appearance and deserve to be planted in most places where trees are used for landscape effect, but in the list suggested they would come below the black walnut.

There is a time in the year when the shag bark hickory, which produces such sweet nuts would be more attractive than any neighboring tree. It is when the big buds swell and send out yellowish-green leaves surrounded by large red bracts. At this time they are as showy and beautiful as any flower. The bracts soon fall, but the leaves turn a rich green and are attractive until early fall, when they are sometimes yellow, and sometimes

drop without any marked coloring. The trunk of this hickory is unique in appearance as the bark separates from the tree in long plate-like strips which hang on at one end and give the scraggly appearance from which the tree derives its name. All of the hickories are attractive in appearance, but some of them drop their leaves early. The hickories are difficult to transplant but this is nothing against the beauty of the tree. An established tree is more valuable on this account. In some places hickories are quite subject to disease or to the attacks of borers.



A CHESTNUT, HEAVY WITH FRUIT. SUCH A TREE IS A COMMANDING FIGURE IN ANY LANDSCAPE

Like the walnuts, hickories which produce edible nuts are subject to the attacks of boys, but, on account of the toughness of the wood and the roughness of the bark, they are usually quite well able to withstand these attacks. Hickories are suitable for use in all landscape work so far as their appearance is concerned. The fact that they are not so used is due to the difficulty of transplanting them. In the fall when a maple tree has colored up beautifully and a hickory near it has dropped its leaves, we are apt to compare the two unfavorably to the latter, but we should remember the appearance in summer and especially when the leaves first unfold. Hickory trees are beautiful also when the leaves are off, their branches making beautiful etchings against the sky in winter. The pecan, which is the largest of all the hickories, is an exception to the general rule because it is planted quite extensively, especially in the South. It is a beautiful tree and where it is hardy there is no reason why it should not be used as a street tree, a tree in home grounds, in parks, or any other

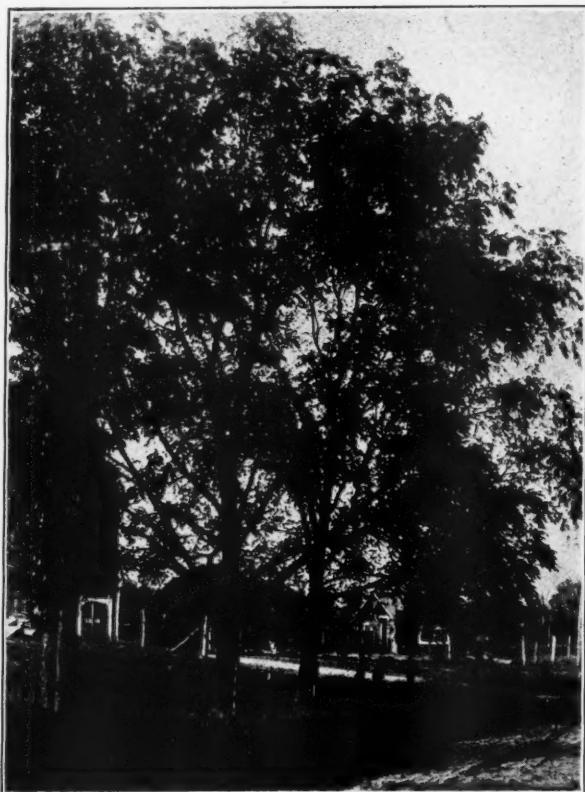


DELIGHTFUL LANDSCAPE EFFECT SECURED THROUGH USE OF PEPPER TREES ALONG THE CURBING OF A STREET IN PASADENA, CALIFORNIA

place where deciduous trees are needed. It is raised extensively in some nurseries, while the other hickories are raised very sparingly, and some not at all.

Many consider the beech the most beautiful of all the nut trees. Its comparatively smooth, bluish-gray bark makes it a distinctive tree at all seasons. Its branches, spreading straight out from the trunk, give it an appearance of strength. Its fine branches from a specially pleasing skyline, its sharp buds are trim and neat in appearance, its leaves are beautiful in shape and texture. Their fall coloring, while not as brilliant as that of the maples, is really beautiful, being either yellow or a rich brown. The leaves are apt to hang on all winter, especially on the younger growth, and then they often turn a beautiful straw color. If a list of beautiful trees for February were to be made, I am rather inclined to think that the beech would stand at the head of the list. A young beech, with its bluish-gray bark, its straw-colored leaves, and flecks of snow here and there, seems to me the most beautiful of all deciduous trees in winter. The young leaves also are especially attractive when they first appear and the blossoms are sometimes objects of interest, although not showy in color.

Often in old pastures one finds forlorn, scraggly looking bushes and is told they are hazel nut bushes. One would not pick out bushes like these to plant in his front yard, and yet, when given a chance, there is scarcely a more attractive shrub than the hazel. It is one of the first shrubs to blossom, the staminate flowers hanging in slender graceful yellowish-brown catkins, while the pistillate flowers are little points of purplish-red protruding from the buds. These blossoms appear long before the leaves. The latter, when fully developed, are beautiful in outline and soft in texture and they have a rich coloring in the fall including various shades of yellow and red. The hazel should certainly be used extensively in landscape work. The nuts, with their leaf-like involucres,



THE INCOMPARABLE BLACK WALNUT, ALWAYS BEAUTIFUL

are attractive in appearance in August and September. In connection with our own hazel one would naturally think of the filbert, which is a European relative. The filbert is often planted for ornament, and a variety with purple leaves is quite popular.

Of all our native trees I think the oak excels in beauty of foliage. By many, oaks might not be considered nut trees, but nearly all of the acorns

are eaten by squirrels or other wild animals and so it would be proper to mention oaks when speaking of nut trees in the landscape. In the northern states we have two groups known as the white oak group and the red oak group. The trees of the former have soft, dull green leaves with rounded lobes, while those of the latter have shiny leaves with lobes ending in points or filaments. The former mature their acorns in one year, while the latter require two years to bring them to maturity. The acorns of the white oak group are sweet, while those of the red oak group are more or less bitter. The foliage of all oaks is attractive when it first appears,



FINE EFFECT OF HORSE CHESTNUT PLANTING ON A WASHINGTON STREET

the small leaves varying in color from almost white, through pink, yellow and red to the deepest purple. Perhaps the red oak excels all other trees in the beauty of its summer foliage and its leaves are also richly colored in autumn. The Bur Oak, in addition to having attractive foliage, has a rough dark bark that gives it an attractive appearance in winter. The white oak, especially when young, holds many of its leaves until spring, and these, with their brown color, give a warmth to the snowy landscape. One could make a most beautiful park by planting nothing but oaks and they should rank with maples and elms as street trees.

The chestnut is a tree which a few years ago would have been considered along with the oak in landscape work, but which now would not be thought of in certain regions on account of a disease which has practically destroyed it. It grows to a large size and, if it were not for the chestnut blight, would be worthy of a place in any park. Hundreds of thousands of dollars have been spent without success in endeavoring to exterminate the blight. Some of the introduced varieties are apparently exempt from this disease, but only the future can tell whether the chestnut will again become valuable in landscape work as well as in the raising of food and lumber.

In designing landscapes we think first of open spaces and then bound these spaces with trees and shrubs having pleasing shapes and foliage. The tops of these trees form the skyline and the lower growth a margin of lawns, or perhaps of walks and drives. For these purposes the beeches, hickories, hazels, walnuts and butternuts are all valuable, their value being approximately in the order named.

There may be some question about including the horse chestnuts and buckeyes in a list of nut trees. The seeds of these trees have, however, been used for feeding stock and perhaps some way may be found for making them available as food for men and women. There is no question about their usefulness for ornamental trees. In Europe the horse chestnut has been used extensively for park and boulevard planting and it is also largely used in the United States. There are several varieties. The leaves appear very early, the blossoms coming out later. Our own buckeyes are handsome in appearance and all are adapted for use in landscape work.

The arguments for and against the use of nut trees in landscape work would be somewhat similar to such arguments regarding fruit trees. The tree with luscious fruit, like the snow apple, would be omitted from the list of trees for a park, not because it lacks beauty, but because its fruit would lead to its destruction. Apple trees might, however, be very appropriate for private grounds. They have sometimes given a name to a home, as "The Orchard." The same is true of certain nut trees, "Walnut Hill" and "Hickory Grove" being not uncommon. The hazel, too, is frequently used in naming home

grounds, streets or localities. A name used in this way has a real and intimate meaning. I am glad there is a movement to encourage the raising of nut trees and hope to see such trees used extensively for the purpose of developing attractive scenery as well as for food production.

THE SOAP NUT TREE

"**M**Y attention has been called to an article in AMERICAN FORESTRY on the subject of the soap nut tree," writes Dr. M. B. Carleton, of Wooster, Ohio. "I suppose it is the same tree that is indigenous in India along the outer ranges of the Himalayan Mountains about the latitude of the middle of Florida. I was born in that country and lived most of my life there. I have often seen the tree and used the skin of the fruit, or nut, in washing clothes and even used it in bathing. It makes a splendid lather and is highly prized in the washing of woolen clothes, for the garments do not shrink as

they do when the ordinary soap is used.

"The tree is a symmetrical and handsome one, with many fine dark green leaves and grows to the height of 40 or 50 feet. One tree in my garden supplied enough fruit for the laundry of my family of seven persons for a year.

"The outer skin only is used. When the fruit is dry it is easily



SOAP NUTS—FRUIT OF THE SOAP NUT TREE

These curious nuts resemble the peculiar Li Chi (Chinese) nuts of childhood, but in appearance only, as the Chinese nut has a delicate, delicious flavor, while the Soap Nut is unfit to eat, its value lying in an entirely different direction.

broken into small pieces by hand and then mixed in plenty of hot water. There is a round black seed within the outer skin which moves and rattles when ripe. The tree is easily grown from this black seed which is as large as a good sized cherry. It is not best to use the lather in washing the face for if it enters the eye, there is much smarting and irritation though I never heard of any permanent injury to the eye and the irritation soon passes off, as I have experienced.

"The fruit, or nut, is nearly the size of a small walnut and is bulky to carry, but the shell can be removed and broken into small pieces to make it compact and more easily transported."

"ALMOST EVERY PAPER THAT COMES

THE continued drive of the American Forestry Association for a national forest policy and for better fire protection for our forests is "found in almost every paper that comes to hand" according to the editor of the *Burlington Hawk Eye* who has a fine editorial on the way the newspapers are co-operating in keeping this all-important subject before the readers. Every phrase of the situation is being discussed by the editors all of whom demand action by the Government. The *Literary Digest* has just devoted two pages to the Association's work.

Burlington, Iowa, Hawkeye: There has come, within quite recent times a notable change in the attitude of the American press toward the question of forestry. Not so many years ago, many papers spoke of forestry slightly. They opined that it was something that might be useful in foreign countries, but of which there was no need here. The majority ignored forestry entirely.

Today, it is impossible to run through twenty or thirty papers without finding at least one article on the subject of forestry, and sometimes almost every paper that comes to hand has something dealing with the subject.

Now, it would not be fair to assume that this change has been wrought simply because paper is made of wood pulp and newsprint paper is now very scarce and very expensive. That may have helped, but it is not the only cause, nor the principle cause. Not even the high price of lumber may be assigned as the cause.

It is rather that the men who study public questions and public needs have arrived at the conclusion that it is high time that the subject was receiving some attention and that it was found by this time that the agitation should have begun years ago. For a need such as exists in the country now cannot be filled in a few short years. It may require a century to give this country the wealth of forest which it requires.

But the main thing, the outstanding thing, the thing that guarantees results, is that the press of the whole country is awakening to the fact that a crying need exists. And that means that the politicians who are always anxious to please the people, will take up and study the problem. The legislatures of the different states and the National Congress may be depended

upon to take the hint and to follow where the press leads. Especially, as they will soon learn that the people stand behind the press in this matter.

San Diego Union: Two measures of vital importance to the future economic welfare of the nation were presented for

Boston Traveler: Mr. Charles Lathrop Pack, head of the American Forestry Association, congratulates the nation upon the fact that the next President of the United States will be a newspaper publisher. For Mr. Pack believes, probably with reason, that the forestry needs of America will be apt to receive their due share of attention from a chief executive who has known what it is to wonder where his next cargo of newsprint was coming from.

It is certainly true that the newspaper publisher, whenever you meet him, is concerned in a special degree, if not over his supply of newsprint for current needs, at any rate over the continuance of that supply for himself and other publishers in the coming years.

To be interested in the matter of pulpwood for paper making is to be interested in the entire problem of timber for the building and manufacturing requirements of the nation. At the present rate of consumption and without a policy of reforestation, the timberlands of the United States will be depleted in sixty to seventy-five years. With proper co-operation of national and state governments and private owners of forest areas, experts tell us, our forests may be made to renew themselves in time to meet domestic needs for many years to come.

No wonder, then, that the people who have been devoting time and energy to the forestry campaign are cheered by the assurance that the next President will be a man with a practical interest already awakened in the perpetuation of the nation's timber supply.

consideration by the resolutions committee of the Republican convention, both of them pertaining to the conservation of our forests. One of the propositions provides for reforestation as a precaution against a famine in all wood products within fifteen years, and the other was in the form of a

protest from the American Forestry Association against President Wilson's "pocket veto" of the water power bill.

The two measures are virtually to the same purpose. Conservation of the forests is the chief factor in conservation of water power. If the forests are cut away, the streams will rush in floods to the sea during the rain period, and go dry in the summer and autumn. If there is no water in the streams, there will be no source of water power. This is the plain logic of the impending emergency.

As to the "wood famine" predicted within fifteen years, the statement might be sustained in the fact that there is a scarcity of wood pulp for the making of print paper; but this argument is somewhat weakened by the allegation of expert observers that there is a vast quantity of the timber material used for this purpose still standing in the forests of the Northwest. However, that may be, it would still be necessary to preserve the spruce. This can be done without affecting the supply to the paper mills, by scientific legislation regulating the harvest and by reforestation.

The same policy should be pursued in all other forest legislation. Preservation and conservation go hand in hand. Building lumber is high in price, whatever the cause, and it will be much higher if it is cut out indiscriminately and wastefully, as is being done at present. Every mature tree in a forest should be replaced as soon as it is converted into marketable lumber.

Closely allied with the two propositions mentioned is the plan proposed for forest planting on unforested areas. This proposition is particularly applicable to the needs of Southern California, and should invite attentive consideration by the business and industrial interests of San Diego. Our water power could be immeasurably increased if the water sheds of our mountain regions were more thickly forested, and the timber line brought nearer to the valley and coast region. Water power for the generation of electrical energy is certain to be of paramount importance to San Diego industry as the oil fuel supply diminishes. Our municipal water supply and water for irrigation are also matters of great concern to us, and closely related to the propositions for reforestation and conservation of existing forests.

During the war we were forced to practice a thrift with which most of us were sadly unfamiliar; since the war conditions have been such that thrift is again forced upon us in the universal necessity of meeting the demands of the high cost of living. Here are two lessons which we should take to heart with the resolve that the experience shall serve all future economic

TO HAND HAS SOMETHING ON FORESTRY"

purposes. We can never hope to prosper by wasting our substance. Our forests are national wealth and one of our most valuable assets of future prosperity. We must not waste them. Let them be not only conserved, but multiplied. We shall sorely need them by and by.

Rochester Herald: W. B. Greeley, chief forester of the United States, declares that there are in the United States a hundred million acres, or about 5 per cent of the total area, capable of producing trees, and fit for nothing else, that are not being put to any sort of use. On much of this land no taxes are paid. Now it is evident that this vast area cannot be brought under tree cultivation by viewing the future with alarm or by scolding the past for its wastefulness. The work of forestation on Government lands can only be done by a comprehensive and continuous programme, backed up by a sufficient appropriation, and on lands privately owned, by agitation and education. In our treeless wastes there is great potential wealth, and we owe it to the generations coming after us to make a start on an extensive plan for the forestation of these areas, that the wealth may be made real. We have had about enough speculation on the subject. It is time now for action.

Indianapolis News: The report of the committee on forest conservation of the American Paper and Pulp Association is significant largely because it agrees in the main with other reports made by other associations having various objects in view. The paper and pulp interests investigated the forest situation with a view to suggesting means of providing for a permanent supply of raw material for the industry. Their committee found that this can best be done by adopting a conservation and reforestation plan similar to that suggested by the American Forestry Association and various State organizations interested in forests.

The forests now existing must be cared for and their products distributed with due regard for conservation. They must be surveyed so that the Government will not have to depend on vague estimates as to the forest resources of the country. New forests must be planted, and not only planted, but constantly watched by experts and developed under expert supervision. Means for research should be provided, and the Federal Government should encourage the States to adopt State forest policies to conform to the national policy and to harmonize with the Federal

forest policy. The States can aid in encouraging the planting of poor farm land in forests.

As to how far the Federal Government should go in acquiring forests and land suitable for developing into forests is a question that must be considered. Manifestly, it is unwise to give the Federal Government a monopoly of the raw material for print paper. In the hands of dishonest politicians, such a monopoly might be used with telling effect. The na-

increased production of paper from pulp has resulted naturally in increased demand for timber, followed of course, by diminishing supply and increasing cost of raw materials. The committee which prepared the report believes that the time has now come for definitely drawn acts of legislation and recommends that authorization be given the committee to proceed immediately in the formulation and introduction into Congress of a bill embodying an adequate national forestry policy upon the general theory that in addition to the direct activities of the National Government, a comprehensive forest policy requires co-operation of the States, since State forest reserves will contribute to national wealth and the products of such reserves will be used by States that are non-contributory. Hence, aid in the State development of forest wealth available for interstate consumption should be contributed by the National Government. An annual appropriation of \$6,000,000 for forest extension, care of forest resources and for research, is asked for, the amount to be expended in each State to bear relation to the amount appropriated for the same objects by the State itself.

The recommendations, the committee says, can not be criticised on the basis of the expense involved, which is exceedingly moderate in view of the magnitude of the problem to be solved, and represent true economy in the treatment of a basic national resource.

One road leads to destroyed resources, lost lives and homes, diminished pay rolls, dwindling markets, higher taxes; the other to life and property safe, market for crops, pleasant camping places, fish and game preserved, community wealth. Which shall it be? So says the *Pueblo Colorado Chieftain*.

national forest policy item in the report lacks a suggestion as to how this danger can be obviated. It is probable that strict supervision and regulation of privately owned forests is to be preferred to Government ownership of vast tracts, but the Government should own forests for experimental and park purposes.

Waterbury American: "The Next Step in the Forestry Program" is the title of the last report of the committee on forest conservation of the American Paper and Pulp Association, which has just been published in pamphlet form. All persons interested in the forests of this country, either as a source of raw materials for our industries, or for other purposes, will be interested in what this committee has to say.

The report says that wood pulp is the chief constituent of approximately 90 per cent of the paper manufactured in this country today, and that the amount of news print paper and other papers manufactured from wood has been increasing tremendously for the past 10 years. The

TO POVERTY OR PROSPERITY



THE SIGNBOARDS

Paterson News: The American Forestry Association has issued an appeal to every school in the country to plant a tree. Tree-planted schoolhouse grounds will serve several ends. If every schoolhouse could be made a center of pretty landscape gardening, the idea would spread from the children to the homes. People would want the grounds around other public buildings improved. The unsightly railroad stations and other structures which now serve the public so shabbily would be given a setting of foliage.

Children who acquire this idea of beautification will keep it when they grow up. When they move to a newly laid out street they won't be content with treeless land and shrubless soil, but will want a nest of verdure around their homes. This will improve property, make real estate more valuable and give a town a reputation for improvement spirit. These children would be apt to become more interested in trees, learn how much value they add to waste land, and perhaps do some reforestation if they ever own land.

OLD MAN OF THE MOUNTAIN

BY GUY ELLIOTT MITCHELL

ONE of the most remarkable human faces in stone is a giant profile which rears its head above the eternal glaciers near the topmost slopes of Mount Ranier. This enormous face, fashioned with most singular fidelity in the image of man, is a remnant of the cone of Ranier when the mountain was an active volcano. It is a precipitous mass of rock and is known as "Gibraltar."



GUARDIAN OF THE MOUNTAIN TOP

The head of the recumbent giant, easily pictured by the imagination, stretched at length and calmly guarding Ranier's slope through the ages.

The face is perfect in every lineament, chin, lips, nose, deepset eye, and overhung brow and forehead. The back of the head is covered with a thick hood. The face is set at an angle of about 45 degrees, apparently gazing up into the heavens, and it requires the exercise of but a slight imagination to conceive the giant recumbent body below the head, the trunk and the huge limbs lying at full length on Ranier's slope, a thousand yards from head to feet, and covered by the white blanket of the eternal glacier. Surely this is the most gigantic natural sculpturing of our continent.

WESTERN hemlock and spruce are the standard mechanical and sulphite pulpwoods for the United States mills in the Pacific Northwest, the hemlock being consumed in greater amounts than any other single species. Hemlock forms 60 per cent of the merchantable stand of timber on the Tongass National Forest, Alaska.

IRRIGATION AN ANCIENT PRACTICE

BY JAMES R. PREDDY

IRRIGATION began in Texas many years before the lands embraced within its boundaries became a part of the United States, years before these same lands made up what was known as the Lone Star Republic. To bring the time down to a more tangible date, the first irrigation work was done—according to tradition—when the Pueblo Indians constructed the peculiar ditches about El Paso and the Pecos country, which authorities of today claim were built for irrigation purposes. Another tradition coming out of the past tells that these ditches were built by the Yuma Indians when they were driven westward by the Comanches and Apaches, and not by the Pueblos. When Coronado, the roving explorer, opened this country to the Spaniards he found well-worked irrigation systems among the Indians; this was in 1540 when he was pushing toward the North. The practice of irrigation was continued under the Franciscan Fathers, who constructed the five mission ditches that were found near the present city of San Antonio. Even under Mexican rule the work did not stop, and grants by the Mexican government often read as follows:

"In the name of the Mexican Nation, grants him one day of water with its corresponding labor of land."

Little advantage was taken of the early start made by the forefathers of Texas until a comparatively recent date. Too long was the statutory encouragement to irrigation delayed, although many a man with an eye to the future saw the great possibilities stored up in the waters of the Texas torrential streams as they wasted out into the gulf. Texas' lands were probably worked for irrigation before those of almost any other State, but when one considers intensive cultivation of the last twenty years, it must be admitted that the Lone Star State has been backward.

Irrigation first came into recognition of the law in 1875, but the acts passed at this time were of no more practical value than were the acts passed thirteen years later. Ten years after this the need for better irrigation began to be felt in certain sections of the State, and this led to the passage of acts which recognized the need for irrigation works in these specific sections. In 1913 the Thirty-third Legislature became impressed with the gravity of the conditions throughout the State, and enacted a statute which created a Board of Water Engineers, into whose keeping the water resources of the State were given. At the present time this board may be said to be the trustee for the State of all water resources.

When the three members appointed on the board came together for the first time and looked the situation over, they found that the field before them was set with difficulties, and yet that it was a field rich in possibilities. Each of the three members on the board were appointed as representatives of one of the three water divisions into which the State had been divided by the Legislature. Later legislation declared certain waters State property, determined the purposes for which water may be stored,

(Continued on page 636)

UNIQUE EXAMPLE OF THE PROPAGATION OF SUGAR MAPLE FROM A CUTTING

BY GEORGE B. SUDWORTH

THERE has recently come to my notice through Major Edward K. Campbell, of Clermont, Florida, a most interesting story of how he propagated a sugar maple, now a large tree, from a cutting. As is known, practically all of our native maple trees, and many, also, of the important exotic species, are grown from seed. A few of the fancy, shrubby maples of foreign origin, such as *Acer palmatum*, *A. cissifolium*, etc., may be propagated by layers and cuttings. It is probable that our native vine maple (*Acer circinatum*) could be grown from layers or cuttings. The red-leafed and cut-leafed and other fancy garden forms of Japanese maples are commonly grafted on the root-stock of a closely related species. Personally, I do not know of another instance in which the sugar maple was grown from a cutting.

Major Campbell informs me that in 1859 when he was a lad of 15, living on a farm in Windham County, Vermont, he cut a twig from a mature sugar maple tree, and sticking the cut-end of the twig into a potato he planted the slip, potato-end down. He said it was common talk

among farmers that slips of fruit and other trees could be rooted in this way. Being curious to know if a maple could be so grown, he planted the maple slip in early spring, before the buds had opened. The twig took root, and for three years (1859-1862) he protected and otherwise cared for it.

Leaving the locality in 1862, Major Campbell said he had seen his maple thereafter more or less regularly every

few years, up to the present time. At an age now of 60 years, the tree is about 33 inches in diameter and 90 feet high. The photographs taken by Miss Lydia B. Franke, of New York City, show distant and nearby views of the tree. Major Campbell is standing in the nearer view. The tree is growing at the foot of Ledge Mountain, in Windham

County, Vermont, the old farm on which it was planted now being known as "Fairmont Farm," owned by Mr. H. A. Bennett, South Londonderry, Vermont.

While I personally know of no other instance of sugar maple having been grown from a cutting, it is, of course, quite possible that some one else may have accomplished this feat.

FEATHERED SENTRY

VERY soon after the beginning of the war it was noticed that cats, dogs, pet and even wild birds, as well as chickens, ducks and geese were aware of distant battles or of the approach of enemies," writes Ladd Plumley in the January number of Boys' Life. "All over the north of England the keepers on game preserves noticed that the pheasants became excited and squawked their alarm when a naval engagement was taking place in the North Sea. In France the approach of hostile airplanes was foretold by the uneasiness shown by bird pets. Early in the war parrots were

placed in the Eiffel Tower to give warning, long before human eyes and ears could detect the fact, of the approach of enemy planes. Very soon, however, the parrots became useless, as they became familiar with hostile airplanes and no longer showed the least interest.

"Of all the animals and birds that gave their warnings as sentries, during the initial stages of the war, the bird that by some strange mixup in ideas is supposed to represent stupidity showed the most amazing instinct in detecting coming danger. In August, 1914, throughout Belgium and northern France the village geese



THE SUGAR MAPLE WHICH WAS SUCCESSFULLY PROPAGATED FROM A CUTTING

This is the tree which Major Campbell grew from a twig cut from a sugar maple in 1859 and stuck into a potato to root. It is now 60 years old—a magnificent specimen 90 feet high, and the pride of the owner.

hissed and screeched their warnings long before the enemy appeared. Possibly the geese felt in their broad webbed feet the vibrations of the earth caused by distant gun and cannon fire, or, perhaps, they detected the air vibrations."

FURNITURE MAKING IN BRAZIL

THE American Consul at Rio de Janeiro reports that before the European war furniture and other manufactures of wood were imported into Brazil to the value of more than a million dollars annually but now Brazilian and Italian workmen in that country are able with Brazilian woods to imitate imported furniture so perfectly that the resulting article is often more beautiful than the model.

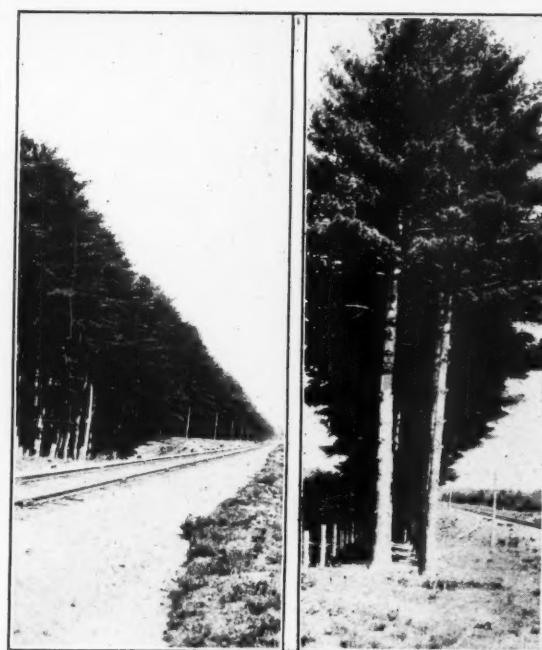
While the Amazon district and the extreme north are famous for their dyewoods and Parana is the home of Brazil's soft wood, Rio de Janeiro and Sao Paulo are the great woodworking centers. Furniture making in Brazil has now reached the stage where its product can compete with the most particular of world markets. In some of the factories the lumber used is all kiln-dried before working. The workshops are equipped with modern machinery, including American machines for veneering purposes. The artisans work on the hardest and most beautiful of Brazilian woods; they do hand carving and inlaid work with a wonderful degree of excellence. Handsome inlaid trays and table tops may be had at a moderate price containing twenty or more varieties of wood. "Imbuya" is the finest wood for furniture making. It comes in a large variety of colors and grains, is hard but easily worked and after kiln-drying, is almost indestructible.

A number of proprietors and foremen in furniture factories have learned their trade in the Lyceo de Arts e Oficios, at Sao Paulo, a school that teaches industrial arts and manufactures various articles. The students work in the shops for three or more years, then leave to become foremen in other factories or do special order work on their own account.

There are more than three hundred varieties of woods in the Sao Paulo region alone and as a whole Brazilian forests not only abound in the finest of woods, but are of enormous extent. Except for a few plateaus, the forests of Brazil stretch from the Atlantic to the heights of the Andes. Transportation facilities are developing slowly and the labor supply is a constant problem in every Brazilian industry but with its enormous resources Brazil should become one of the world's principal sources of lumber.

RAILROAD TIES IN SOUTH AMERICA

A STRIKING illustration of the depletion of our woodlands and doubtless also of the lack of labor in work on those which remain is contained in a statement by Hermann von Schrenck, of St. Louis, a railroad tie expert, that while oak ties cost \$2.00 each in this country, serviceable ties costing only \$1.40 each are being imported from South America.



A RAILROAD PLANTATION

A magnificent plantation of white pine growing directly in the limits of a railroad right-of-way is a rare sight, and is somewhat of a surprise to those who suppose that a railroad marks one continuous line of forest fires and devastation. About sixty years ago, the official in charge of the right-of-way of the Greenville branch of the Boston and Maine Railroad, although in these days this branch was a tiny independent railroad, known as the Shirley and Peterboro, apparently because it ran from Ayer, Massachusetts to Greenville, New Hampshire, conceived the idea that a double row of pines on the north side of the track would serve as an efficient snow-break. Acting on this idea, he planted in Townsend, Massachusetts, about three miles of white pines in two rows eight feet apart and eight feet apart in the row. A few sections of this snow-break were apparently burned out, but the greater part is growing today, a fine monument to the foresight and courage of this pioneer railroad man.—H. O. Cook, Chief Forester, Boston, Massachusetts.

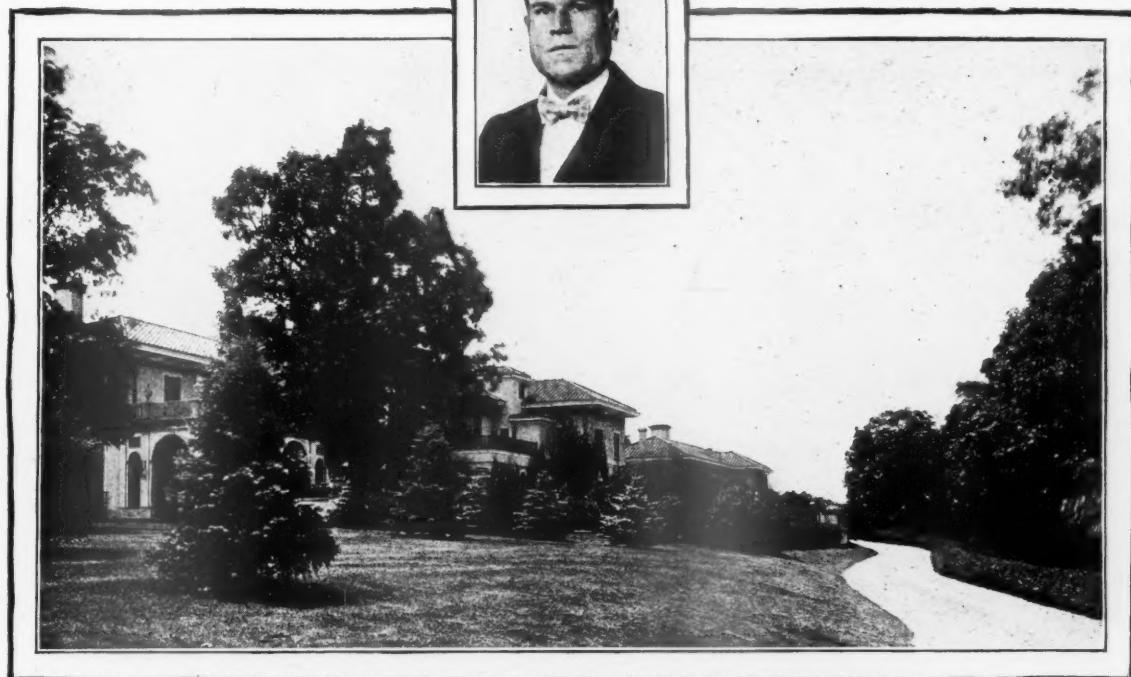
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SEALED bids in duplicate, marked outside "Bid Calimus-Marsh Unit," and addressed to the Superintendent, Klamath Indian School, Klamath Agency, Oregon, will be received until two o'clock P.M., Pacific time, Wednesday, October 27, 1920, for the purchase of the merchantable timber on the tract in Townships 31, 32, 33 and 34, Ranges 8, 9 and 10, Willamette meridian, Klamath Indian Reservation. The said unit includes about 67,000 acres with a total stand of approximately four hundred fifty million feet of timber, principally western yellow pine, of which about fourteen million feet is on about 2,500 acres of allotted land, as to which separate approved contracts with the Indian owners may probably be made. Each bid shall state the price that will be paid per thousand for yellow pine, sugar pine and incense cedar, and for other kinds of timber that will be cut and sealed prior to April 1, 1924. Prices subsequent to that date are to be fixed by the Commissioner of Indian Affairs for three-year periods. No bid will be accepted for less than \$4.00 for yellow pine, sugar pine and incense cedar and \$1.60 for other species during the period ending March 31, 1924. Each bid must be accompanied by a certified check on a solvent national bank drawn in favor of the Superintendent of the Klamath Indian School to the amount of \$40,000.00. The deposit will be returned to unsuccessful bidders, but retained as liquidated damages if the successful bidder shall not execute contract and furnish satisfactory bond for \$50,000.00 within sixty days from the acceptance of his bid. The right is reserved to waive technical defects and to reject any or all bids. For copies of contract and regulations, fuller description of the sale area, and other information, apply to the Superintendent of the Klamath Indian School, Klamath Agency, Oregon.

Washington, D. C., August 10, 1920. CATO SELLS, Commissioner.

PENNSYLVANIA'S STATE FORESTER'S CONFERENCE

ONE of the important features of the reorganization of the Pennsylvania Department of Forestry under the leadership of Gifford Pinchot was a conference at Mont Alto from July 23 to August 6 for all foresters in the employ of the State. The foresters were called together to discuss the various phases of forest activity within the State, particularly those relating to the administration and protection of State forest land, and to formulate policies and procedure for the conduct of the Department's work. The conclusions of the conference will be incorporated in a manual of regulations and instructions for the guidance of State forest officers. In addition to the State foresters there were present, during the course of the conference, representatives of other State departments, the State Forest Commission, the United States Forest Service, and the forestry staff of Pennsylvania State College.

The spirit of the conference was that the Pennsylvania forest problem is a large one and can be met adequately only by earnest and self-sacrificing effort. One of the earliest moves of the new Commissioner had been to secure more adequate compensation for the State forest personnel. In order to do so with the limited funds available the separation of a number of foresters from the service pending more liberal appropriations had been decided upon in a general conference with the foresters, who suggested this course as the wise one to take for the good of the service. The reduction in personnel necessarily resulted in increasing the area of State forest land under the administration and protection of each forester from approximately 25,000 acres to from 50,000 to 70,000 acres.

The Mont Alto conference also decided upon the redistricting of the State into twenty-five units, termed districts, each to be in charge of a forester. The district areas vary from 45,000 to 600,000 acres, depending upon the quantity of State forest land included and the intensity of the problems presented. Under the plan all timberlands within the State are covered by the protective system of the Department.

The Department's policy, with which the Governor is in full sympathy, is to acquire ultimately six million acres of timberland within the State or about one-half of the State's potential timberlands. It is striving also for more liberal appropriations, particularly for fire protection, in order to more effectively meet its responsibility for protecting the timberlands of the State. Its program is said to be meeting with increased support on the part of timberland owners and citizens of the State in general, who are more and more appreciating the disastrous results which attend forest fires and the need for intelligent management of timberlands.

TIMBER IN NEW ENGLAND

THE output of lumber in the next decade in Maine, Vermont and New Hampshire will be greatly reduced because of the heavy inroads on the timber made by the pulp and paper industry. The paper manufacturers are making an effort to get all available pulp stock before it is necessary to abandon their plants. The result is that much of the timber that would otherwise be cut into lumber has been made into wood pulp. If it were not for the pulp and paper interests, the New England States, says a recent investigator of timber conditions, could keep up their present rate of lumber production for a long period. It is estimated that the production in Maine will shrink a quarter of a billion feet in the next ten years although it had been said that Maine would hold her own from now on. The same situation prevails in a proportionate degree in Vermont and New Hampshire.

The Forest Service has been investigating production, timber stand, etc., in these New England States this spring in preparation for the report required by the Senate under the Capper Resolution.

MIGRATORY BIRDS ON THE INCREASE

A MARKED increase in migratory wild fowl throughout the United States, instead of the alarming decrease which led to steps for their protection, is noted in reports received by the Biological Survey, United States Department of Agriculture, from all parts of the country during the past few months. The change is attributed to the good effects of the migratory-bird treaty.

Friends of the migratory birds believe that the first important step for the perpetuation of the birds has been made, but that another one equally vital remains to be taken. This consists of the conservation and perpetuation of a sufficient number of small inland lakes, as well as island and coastal swamps and marsh areas, to provide the birds places for feeding and resting and rearing their young.

It is absolutely necessary, they point out, that the birds during migration and in winter have proper places in which to live. It is a mistaken idea, they say, that the drainage of almost any area is a benefit to the community. Under proper conditions, "water farming" of many lakes and ponds and of swamp and marsh areas will yield a distinctly larger return than would the same area if drained and used for agriculture. They summarize the productiveness of such farms as follows:

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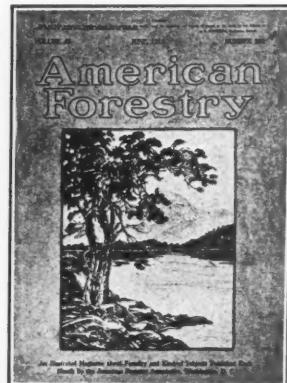
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ST. PAUL PLANTS 4,280 SHADE TREES

THE city of St. Paul, through its Forestry Division, undertook and finished a single job of tree planting this season of 4,280 street trees in one of its new residence districts. This makes a double row of trees 15 miles long. The season was not long and the manipulation of the various phases of the work deserves some mention, as even a thousand trees is considered a large order to plant on streets in most cities.

The trees were dug from the nursery by a tree digging machine and shipped into the city in car load lots, averaging about 430 trees per car. The trees for each car load were dug and loaded in the car and started on its way for the city the same day. The following day the car load of trees would arrive in the city and a crew of men supplied with two trucks would start unloading the trees from the car. In one day the car would be emptied and the trees placed in the holes along the streets to be planted. The trees were "heeled in" each one in the hole where it was to be planted.

While the nursery crew and the crew unloading were working, a much larger crew was at work digging holes along the streets to have them ready for the trees. The hole digging crew was always 500 holes ahead of the crew hauling the trees from the cars. Still another crew with ten teams was busy hauling black loam for the tree planting, as each tree was finally planted in one cubic yard of black loam. The planting crew followed the hauling crew and planted the trees which had been "heeled in" in the holes along the streets. By this method a steady "stream" of trees came from the nursery to be planted on the streets and in such a manner that the roots of the trees were always moist. Furthermore the trees were planted with the least amount of handling, as the nursery is supplied with a spur track from the railroad that extends directly in the nursery.

After the trees were set in the holes and properly planted, two men trimmed them with pruning hooks while the crews cleaned up around the trees and mulched them with grass cut off the boulevards.

Plans for tree planting on a job of any size must be drawn by an engineer and the stakes set ahead of the planting crews by a surveyor, in such a way as to miss all sewer connections. The job was finished in one month. The trees were American elms, ten to twelve feet tall and two to two and one-half inches in caliber and cost the property owners less than \$5.00 per tree. To date, July 20, there are only 17 dead trees in the whole job.

The work was under the supervision of the City Forester of St. Paul, E. L. Finney, of the Department of Parks, Playgrounds and Public Buildings.

HONEY SWEET BLACK RASPBERRY
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Honeysweet has now found its way into every State in the Union and many parts of Canada. Wherever it goes it is a winner. Planted commercially we know of nothing that will pay such immense returns per acre as this new and wonderful variety. Many growers received \$1.05 per pound for this year's crop of dried Black Raspberries.

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Stumpage Prices—Lowest rates considered, \$4.25 per M feet for western yellow pine, \$5.50 per M feet for sugar pine, \$1.50 per M feet for white fir and incense cedar, \$2.00 per M feet for Douglas fir, and for material unmerchantable under the terms of the contract, to be removed at the option of the purchaser, for which payment is required by the Forest Service, \$0.50 per M feet.

Deposit—\$10,000.00 must be deposited with each bid to be applied to the purchase price, refunded or retained in part as liquidated damages, according to conditions of sale.

Final Date for Bids—Sealed bids will be received by the District Forester, San Francisco, California, up to and including October 19, 1920. The right to reject any and all bids is reserved. Before bids are submitted full information concerning the character of the timber, conditions of sale, deposits, and the submission of bids should be obtained from the District Forester, San Francisco, California, or the Forest Supervisor, Sonora, California.

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DOMESTIC EXPORT

(Continued from page 624)
and determined the purposes for which water may be appropriated.

Great waste of valuable waters has always taken place in Texas during the periods of periodical floods of the various rivers. In some parts of the State these floods take place as often as two or three times during the same year, while in others the overflows come only every two or three years. Conservation of this flood flow is one of the expressed duties of the Board of Water Engineers. The policy in the past has been to encourage the people along such flooding rivers to build dams and reservoirs so that the water may be impounded and distributed for use at the time that it is most needed by the farmers. Another step in this conservation was taken when the plans were completed with the United States Geological Survey for co-operative investigation of the water resources of the State which led to a system of stream measurement by gage stations, forty-two of which were in operation by August 31, 1918.

Big irrigation projects are always encouraged by the Board of Water Engineers. Any person or company by depositing a fee of \$250 may obtain the priority right to his irrigation project if he can satisfy the Board of Water Engineers that adequate engineering force is available. During the past three years presentations have been filed with the board for projects on the Frio River in Uvalde County, on the Pecos River in Reeves County, and on the Colorado River in Matagorda and the adjoining counties.

One of the big irrigation projects that has been completed within recent years is the Medina River dam system. This is one of the greatest pieces of engineering work in the State. The water is impounded into lakes or reservoirs by three dams. The main dam is 128 feet wide, 1,580 feet long, and 180 feet high from crest to the bottom of the foundations. It is equipped with machinery and appliances for letting the water gradually into the secondary reservoir through discharge pipes five feet in diameter. The lake formed is 152 feet deep at the dam, 16 miles long, 1 and $\frac{1}{2}$ miles wide, and has a shore surface of 93 miles. The distribution of the water takes place through canals and laterals, and the primary purpose of the entire work is irrigation.

Probably the largest irrigation project before the State today is the Big Wichita River irrigation project which is to be constructed in north Texas, where the land to be irrigated is 1000 feet above the sea level. The proponents of the project plan to build a large storage reservoir by constructing a dam across the Big Wichita River about fifty miles above Wichita Falls. A diversion dam is to be built to throw the water into canals on each side of the river. The principal work then will be to construct the storage dam, the diversion dam, and the distributing canals. The

Big Wichita at certain times during the year is a torrential stream, carrying some silt, and an analysis shows that except at very low stages the water is of very good quality, being practically free from alkali. It has an annual discharge of from 200,000 to 1,000,000 gallons, and the mean rainfall for the vicinity for a number of years is 27 inches. The country to be irrigated surrounds the hustling oil and gas city of Wichita Falls, and irrigation means that the crops of cereals, cotton, and fruits that are now grown will be produced in more abundance and with a greater degree of certainty of success.

Success as it has come to the big irrigation constructions in the last few years is due largely to the Board of Water Engineers, and to it goes the credit for the advancement in this work that has taken place throughout the State. Since the war presentations have been filed for a various number of projects, especially from the lower Rio Grande valley; projects begun before the war are being renewed; in short irrigation instead of decreasing in Texas seems to be entering upon a period of great advancement.

SHADE TREE LAWS

THE man who recently wrote to the Secretary of the New York State Forestry Association at Syracuse, New York, and told him that the authorities in charge of enforcement of the shade tree laws of the State were "saving at the spigot and losing at the bung" may go on record as the citizen who precipitated the action that led to the needed reform in the matter of shade trees.

An editorial in the August issue of New York Forestry, official journal of the New York State Forestry Association, argues that this so-called bung leakage is not in the barrel of any one organization or State Department; that it is a loss sustained by the whole people of the State, and one which the people themselves must remove by driving in the bung with a brand new shade tree law.

It appears that a land owner residing on any country road may cut down noble oaks, elms and other trees along the highway for cord wood, plow the land to the very edge of the road without interference, and that the law has permitted him to set out saplings in the spring and get 25 cents each in reduction of taxes. Public Service corporations also have certain rights under the law which seem to work to the disadvantage of private citizens seeking to beautify the highway adjoining their property by planting valuable trees.

The State Forestry Association will submit a proposition to its entire membership this fall by letter ballot, with a view to determining whether codification and revision of the State's shade tree laws shall be one of the objectives in the winter campaign for necessary forestry legislation. The Association is appealing for the support of all citizens who are interested.



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BOOK REVIEWS

THE Fungal Diseases of the Common Larch, by W. E. Hiley, 204 pages, published by the Clarendon Press, Oxford, 1919. This treatise attempts to discuss the diseases of the European larch (*Larix Europa*) and their economic importance in terms understandable by the layman, while at the same time including thoroughly scientific descriptions of the characteristics and life history of the fungi described. Nearly a quarter of the entire volume is devoted to a discussion of the larch canker (*Dasyscypha calycina*), which is described as exceedingly common, very destructive, and likely to become even more disastrous in the future than it has in the past. At present the canker is prevalent only in Europe, but it has been reported from Newfoundland so that the danger to America is imminent. The canker works both in dead wood and in the cambium, which it gradually kills until eventually the tree is girdled. Eradication of the canker, which is one of the most virulent diseases of forest trees, is practically impossible. After it has once become established, the maintenance of optimum silvicultural conditions is emphasized as the best means of prevention.

Considerable space is devoted to various heart rots and the honey fungus (*Armillaria mellea*). The latter is characterized as probably the most destructive disease with which British forestry has to contend. It can kill all species of conifers and a great many broadleaf trees, and in many woods is so common that its eradication is well-nigh impossible. The proper silvicultural treatment and particularly the correct choice of site, soil and mixture are recommended as the best preventives for this disease, as well as for the larch canker. In the case of heart rots, frequent sample boring with a Pressler's increment borer are recommended as a means of detecting heart rot in its incipiency, so that the affected trees can be removed before they have been seriously damaged. Leaf diseases are dismissed rather briefly as less harmful than the needle diseases of other conifers on account of the deciduous habit of larch.

The point is brought out that larch is more prone to disease than any other conifer commonly grown in British woods and attention is called to the fact that Douglas fir and Sitka spruce from Western America are now being widely used in situations which would formerly have been occupied by larch. Both trees are faster growing than the larch and good returns may be expected from them on suitable

BOOKS ON FORESTRY

AMERICAN FORESTRY will publish each month, for the benefit of those who wish books on forestry, a list of titles, authors and prices of such books. These may be ordered through the American Forestry Association, Washington, D. C. Prices are by mail or express prepaid.

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THE HISTORIC TREES OF MASSACHUSETTS—By J. R. Simmons.....	1.65
TIMBERS—AND THEIR USES—By Wrenn Winn.....	5.15
THE PRESERVATION OF STRUCTURAL TIMBER—Howard F. Weiss.....	3.50
THE UNITED STATES FOREST POLICY—By John Ise.....	5.15
THE KILN DRYING OF LUMBER—By Harry D. Tiemann.....	4.65

* This, of course, is not a complete list, but we shall be glad to add to it any books on forestry or related subjects upon request.—EDITOR.

soils, but with neither of them is there such a ready sale for thinnings of all ages as there is with the larch. Japanese larch and western larch are nearly, but not quite, immune from the canker, growing slightly faster than the European larch during their early years, and where grown on a short rotation are safer and at least as remunerative as the latter.

"WAR MEMORIALS," one of a delightful collection of poems by Abigail F. Taylor, is published elsewhere in this issue of AMERICAN FORESTRY. Her book comes from the press of Small, Maynard & Company, Boston, and is called "Verse of Today and Yesterday." It is well named, the poems are full of feeling, inspired by the strongly real.

TIMBER FROM LIVE AND DEAD TREES

PREJUDICE exists in certain quarters against the use of timber cut from dead trees, and some purchase specifications insist that only timber cut from live trees will be acceptable. As a matter of fact when sound dead trees are sawed into lumber, and the weathered or charred outside is cut away, there is no method known to the Forest Products Laboratory by which the lumber can be distinguished from that cut from live trees, except that the lumber from dead trees may be partly seasoned when sawed.

All the information available at the laboratory indicates that timber cut from insect or fire killed trees is just as good for any structural purpose as that cut from live trees of similar quality, providing the wood has not been subsequently injured by decay or further insect attack. If a tree stands on the stump too long after it is killed, the sapwood is likely to become decayed or badly infested by wood-boring insects; and in time the heartwood also will be similarly affected. The same thing is true of logs cut from live trees and not properly cared for. Until the wood becomes affected by these destructive agents, dead tree wood should be just as strong and just as durable as sound live tree wood.

In considering the subject it may be useful to remember that the heartwood of a living tree is entirely dead, and in the sapwood only a comparatively few cells are living. Most of the wood cut from trees is dead, therefore, regardless of whether the tree itself is living or not. Such being the case, purchase specifications, instead of providing that material must not be from dead trees, should state that material showing evidence of decay or insect infestation exceeding a specified limit will not be accepted.

BRITISH IMPERIAL FOREST POLICY

AT the recent British Forestry Conference in London, attended by delegates from all parts of the Empire, it was emphasized that "the foundation of a stable forest policy for the Empire and for its component parts must be the collection, co-ordination and dissemination of facts as to the existing state of the forests and the current and prospective demands on them. To this end it is of the first importance that a systematic survey be undertaken in each part of the Empire which will not only serve as the basis of the forest policy in that part, but also provide a means for reviewing the forestry position of the Empire as a whole."

The destruction of forests in the United Kingdom during the war for military purposes, says the United States Consul at London in Daily Commerce Reports, and the dependence upon overseas supplies have led to extensive reforestation plans and given stimulus to governmental action toward securing a scientific forest policy

based on the economic principles of annual cutting of surplus timber as a crop and provision for automatic reproduction, as well as the reforestation of large unused areas.

It is urged that each of the governments of the Empire should lay down a definite forest policy to be administered by a properly constituted and adequate forest service, and a central Forestry Bureau in London is recommended for study, research and reference.

FOREST RESEARCH

A COMPLETE summary of all of the scientific investigations upon forest problems which are now under way in the United States and in Canada has recently been published as a bulletin upon "North American Forest Research" by the National Research Council, Washington, D. C.

In this bulletin 519 different projects for investigation are described including the reforestation of cut-over areas, the replacement of timber cuttings by natural growth, the control of insect pests and fungus diseases of forest trees, beneficial modifications of lumbering practice, the preservation of timber in use, the utilization of by-products and the relation of forestry to rainfall, control of flood waters, grazing, etc.

The importance of the most penetrating study upon the conservation of our remaining forest resources is brought home by the recent announcement of the Forest Service that "three-fifths of the original

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timber of the United States is gone and that we are using timber four times as fast as we are growing it." Our annual consumption of lumber alone is over 300 board feet per capita, and of newsprint is 33 pounds per capita. Cut and burned over forest lands in the United States, now waste

territory, equal in area the whole of the present standing forests of Denmark, Germany, Holland, Belgium, France, Switzerland, Spain and Portugal. The total population of these countries is about 152,000,000, nearly 50 per cent greater than the population of the United States.

FORESTERS ATTENTION

AMERICAN FORESTRY will gladly print free of charge in this column advertisements of foresters, lumbermen and woodsmen, discharged or about to be discharged from military service, who want positions, or of persons having employment to offer such foresters, lumbermen or woodsmen.

POSITIONS WANTED

WANTED—Position as Forester and Land Agent. Technically trained forester, 35 years old. Practical experience along all lines included under the duties of the above positions. Former Captain, Field Artillery. Address Box 840, care American Forestry, Washington, D. C.

A FORESTRY graduate with several years experience in forest work and at present employed along technical and administrative lines desires responsible position with private concern operating in and outside the United States. Address Box 870, care of American Forestry Magazine, Washington, D. C.

DISCHARGED SAILOR would like position as assistant forester or a permanent position as surveyor with some lumber company with a chance for advancement. Salary is of secondary consideration. Married, so would have to locate in some small town. Have had four years' practical experience in general forestry, and some tree surgery. Address Box 900, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

SUPERINTENDENT retail lumber and building material establishment desires connection with progressive lumber concern in locality where there is opportunity for growth. West, Southwest or Middle West preferred, but not essential. Several years experience retail and manufacturing, also eighteen months overseas with Forestry Engineers. Available after August 15th. Address Box 830, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C. (8-10-20)

School of Forestry UNIVERSITY OF IDAHO

Four Year Course, with opportunity to specialize in General Forestry, Logging Engineering, and Forest Grazing.

Forest Ranger Course of high school grade, covering three years of five months each.

Special Short Course covering twelve weeks designed for those who cannot take the time for the fuller courses.

Correspondence Course in Lumber and Its Uses. No tuition, and otherwise expenses are the lowest.

For Further Particulars Address

**Dean, School of Forestry
University of Idaho
Moscow, Idaho**

POSITION wanted by technically trained Forester. Have had fourteen years experience along forestry lines, over five years on the National Forests in timber sale, silvicultural and administrative work; three years experience in city forestry, tree surgery and landscape work. Forester for the North Shore Park District of Chicago. City forestry and landscape work preferred, but will be glad to consider other lines. Can furnish the best of references. Address Box 600, care American Forestry Magazine, Washington, D. C.

YOUNG MAN recently discharged from the U. S. Navy, wants employment with wholesale lumber manufacturer; college graduate; five year's experience in nursery business; can furnish best of references. Address Box 675, care American Forestry Magazine, Washington, D. C.

RECENTLY discharged from U. S. Army, young man wants position with a firm who has use for a lumber tallyman and inspector. Has a good education, 11 years' practical experience in lumber and can furnish good references. Address Box 880, care of American Forestry Magazine, Washington, D. C.

ARBORICULTURIST is open to an engagement to take charge of, or as assistant in City Forestry work. Experience and training, ten years, covering the entire arboricultural field—from planting to expert tree surgery—including nursery practice, and supervision in the care and detailed management of city shade trees. For further information, address Box 700, care of American Forestry.

**Nominate Your Friends for
MEMBERSHIP
in the
American Forestry
Association**

POSITIONS OPEN

"CIVIL ENGINEER TO SURVEY AND MAKE DETAIL MAPS, ABOUT 2,000 ACRES, NEAR NORWICH, CONNECTICUT. EXCELLENT BOARD AND LODGING. STATE TIME AND TERMS. Address Box 940, care of AMERICAN FORESTRY MAGAZINE, Washington, D. C.

WANTED—Two technically trained foresters. One as Assistant Forester for technical work with headquarters at Trenton, New Jersey, and one as Division Firewarden with headquarters in northern part of State. Firewarden to own and operate automobile for which liberal mileage charge is paid. Salary to start \$1,500 and field expenses. If unwilling to apply at this figure submit applications stating minimum salary. Address Department of Conservation and Development, C. P. Wilber, State Firewarden, State House, Trenton, New Jersey.

MAN WANTED with technical training and practical experience sufficient to make him thoroughly competent as a developer of Park plans, and also Park Superintendent—both in road construction, planting and landscape work—and Director of Forestry Service upon the public streets and parks of the city. Address Box 910, American Forestry Magazine, Washington, D. C. (6-9-20)

WANTED—An assistant forester. Good place offered for a recent graduate who would like to get in business for himself in an excellent location. Address Box 920, AMERICAN FORESTRY MAGAZINE. (8-10-20)

PLANT MEMORIAL TREES

HELP WANTED—A large Pulp and Paper Company Requires men for its forestry operation and surveying in the Province of Quebec. Men having technical training or bush experience, or both, are preferable, but any that are physically fit and willing to persevere and rough it will be carefully considered. Apply Box 960, American Forestry Magazine.

EQUIPPED WITH NOISELESS TYPEWRITERS

WHEN the American Forestry Association was compelled by a fire to vacate its eight offices in the Maryland Building, Washington, D. C., the only quarters obtainable was a very large room housing the whole Association. The twenty-five typewriters required to do its work made such a persistent clatter that the editorial and publicity departments were seriously inconvenienced. These typewriters were disposed of and Noiseless Typewriters secured, the noise thus eliminated and all the departments enabled to work comfortably and quietly together in one room.

FORESTRY EDUCATION

THE British Empire Forestry Conference, which met in London during July adopted the following resolutions on forestry education, which the delegates are to bring to the notice of their respective governments:

It should be a primary duty of forest authorities throughout the Empire to establish systematic schemes of forest education. It has been found, for climatic and other reasons, that it would not be possible to reach part of the Empire to establish a complete scheme of forestry education of its own, and therefore, it is essential that those parts of the Empire which are willing and able to establish complete systems should, as far as possible, frame such schemes with a view to combining for meeting the needs of those parts which can only themselves make a partial provision for their requirements.

IDAHO SCHOOL OF FORESTRY

THE School of Forestry, University of Idaho at Moscow is announcing the 1920-21 session of its Ranger Course, to open November 1 and close March 21. The work is for forest rangers and guards wishing to prepare themselves for more rapid advancement; for young men planning to enter the ranger service; also for men in logging camps and sawmills, or connected with any other phase of the timber industry, who wish to increase their efficiency, but who cannot spare the time for a fuller course.

The work is of high school grade and admission is without examination. The course, which is thoroughly practical, prepares for the civil service examination for the position of forest ranger. Experts from the United States Forest Service will assist in giving the instruction.

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